Owens Valley Tribal Climate Pollution Reduction Project

Climate Pollution Reduction Grant

Priority Climate Action Plan

Owens Valley Indian Water Commission

Big Pine Paiute Tribe

Bishop Paiute Tribe

Lone Pine Paiute-Shoshone Tribe

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1.0 INTRODUCTION

Owens Valley Tribal Consortium

The Owens Valley Tribal Climate Pollution Reduction Project pertains to a consortium of three Tribal governments in Inyo County that are coordinating efforts through the Climate Pollution Reduction Grant (CPRG) program. For this project, the Owens Valley Indian Water Commission (OVIWC) is the lead agency on behalf of three partner Tribes: The Bishop Paiute Tribe, Big Pine Paiute Tribe, and Lone Pine Paiute-Shoshone Tribe; collectively the Owens Valley Tribal Consortium (OVTC). Inyo County is currently designated as being in non-attainment for the federal PM10 standard and the California state ozone and PM10 standards. It is also projected to experience climate change impacts including increased severity of wildfires and increased average temperatures.

CPRG Overview

The CPRG program supports the development of strategic plans for reducing Greenhouse Gas (GHG) emissions and implementation of projects that reduce GHGs and associated co-pollutants. The initial planning phase includes the development of a Priority Climate Action Plan (PCAP) and Comprehensive Climate Action Plan (CCAP). This document serves as the Owens Valley Tribal Climate Pollution Reduction Project PCAP and contains the required elements including GHG emissions inventories, quantified emissions reduction measures, benefits analysis, and review of authority to implement.

PCAP Overview

The PCAP is focused on an initial GHG inventory for the base year of 2022. For this inventory, data was collected from the Tribes in accordance with the Quality Assurance Project Plan (QAPP) that was submitted on October 27, 2023. Where available, data from the reservations included electricity use, point sources, non-point sources, on-road and non-road mobile sources, solid waste generation, agriculture, land management, water, and wastewater processing. If site specific data was unavailable, emissions estimates were made using national or regional databases and downscaled based on the reservation characteristics.

Emissions reduction measures were identified and prioritized by each Tribe to form a strategic plan to reduce GHG emissions. In determining these measures, the Tribes considered CPRG program alignment, existing or planned projects, funding and cost considerations, and time constraints for implementation. Emissions reduction estimates were calculated when feasible and are included in the PCAP.

An analysis of benefits from implementing the emissions reduction measures contains an inventory of co-pollutants for each reservation for the base year of 2022. These estimates are based on the National Emissions Inventory (NEI) and downscaled for each reservation. Additional co-benefits from implementing emissions reduction measures are analyzed qualitatively for economic, health, safety, and resiliency considerations.

The CCAP will expand on the PCAP to include a more comprehensive GHG inventory using more specific emissions and energy use data, if available, and also include GHG sinks from carbon sequestration. GHG emissions reduction targets and projects will be included in the CCAP to help gauge the performance

and success of reducing emissions. Plans for funding and workforce requirements will be developed to build a roadmap for implementation of emissions reduction measures.

1.1 CPRG Objectives

The CPRG program is administered by the U.S. Environmental Protection Agency (USEPA) and funded through the Inflation Reduction Act of 2022 (IRA).

Three overarching objectives the USEPA intends to achieve through IRA include:

- Tackle damaging climate pollution while supporting the creation of good jobs and lowering energy cost for families
- Accelerate work to address environmental injustice and empower community-driven solutions in overburdened neighborhoods
- Deliver cleaner air by reducing harmful air pollution in places where people live, work, play, and go to school

CPRG is designed to reduce GHG emissions that are contributing to climate change by providing funding to states, municipalities, tribes, and territories for planning and implementation of emissions reduction measures. Through implementing GHG emission reduction measures, CPRG also aims to restore ecosystems, improve deteriorating infrastructure, foster economic growth, and bolster public health by reducing the pollution burden that disproportionately affects disadvantaged communities.

The two phases of the CPRG program include: 1) Planning (PCAP & CCAP); and 2) Implementation. The PCAP prioritizes emissions reduction measures that will be pursued during Phase 2. This implementation phase contains specific goals for Tribes (and other eligible applicants). These include:

1. Implement ambitious measures that will achieve significant cumulative GHG reductions by 2030 and beyond
2. Pursue measures that will achieve substantial community benefits (such as reduction of criteria air pollutants (CAPs) and hazardous air pollutants (HAPs)), particularly in low-income and disadvantaged communities
3. Complement other funding sources to maximize these GHG reductions and community benefits; and
4. Pursue innovative policies and programs that are replicable and can be “scaled up” across multiple jurisdictions

1.2 PCAP Objectives

The primary objective of this PCAP is to serve as a strategic plan for reducing tribal emissions of GHGs and other harmful pollutants. This is achieved through the following plan objectives:

- Perform intergovernmental collaboration with members of the OVTC
- Document the results of GHG emissions inventories
- Identify and prioritize emission reduction measures
- Evaluate GHG reductions and co-benefits from implementing prioritized emissions reduction measures

Outcomes of the PCAP, including the GHG and co-pollutants emissions inventories and prioritization of emissions reduction measures, will build capacity and climate resilience while maximizing benefits to overburdened and underserved communities. This in turn will further the EPA's goals for IRA and the CPRG program.

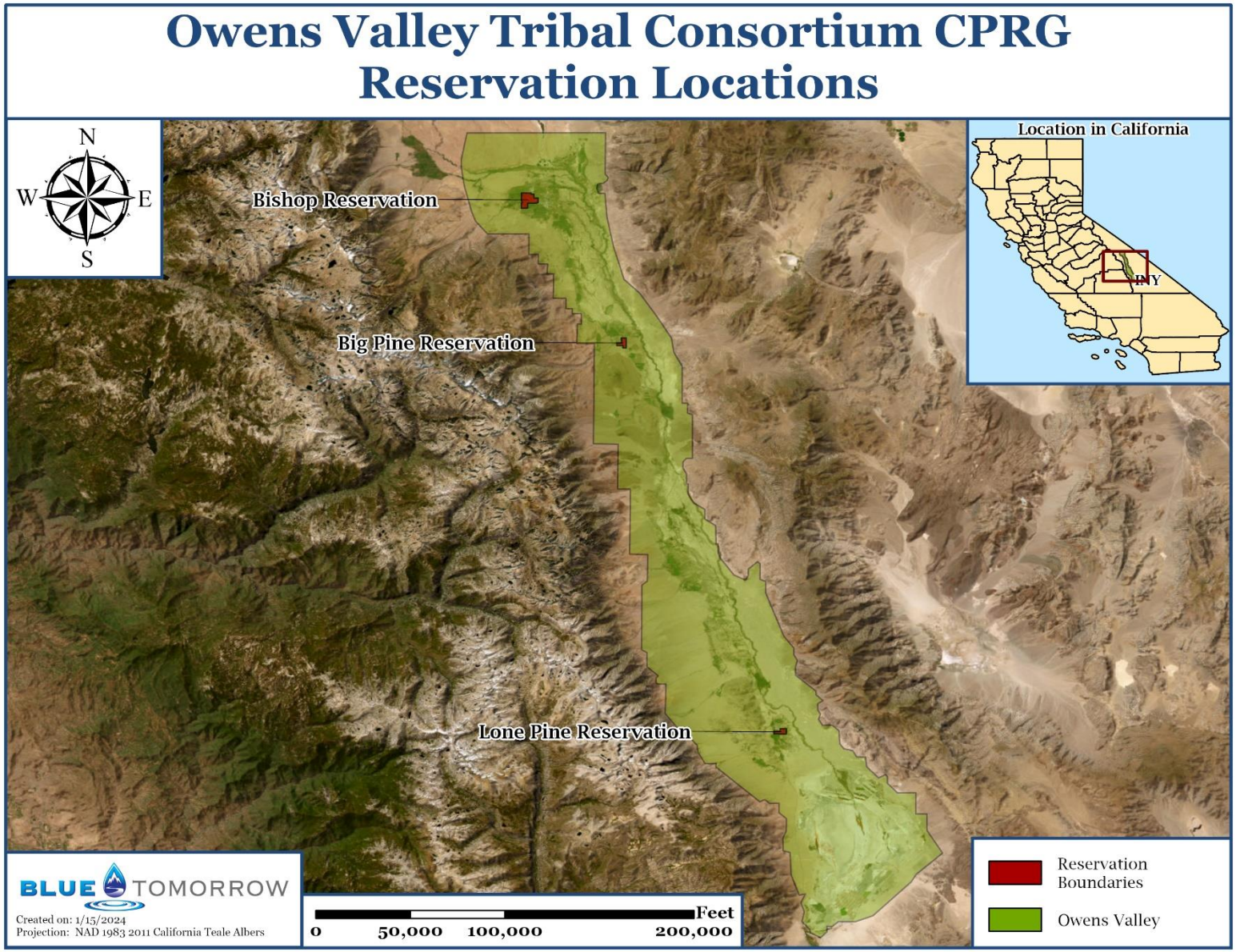
2.0 BACKGROUND

2.1 Owens Valley Indian Water Commission (OVIWC)

In 1991, the Owens Valley Indian Water Commission was established between the Bishop Paiute Tribe, Big Pine Paiute Tribe, and Lone Pine Paiute-Shoshone Tribe (Map 1). The water rights of Tribes that reside in Owens Valley have long been disputed and unjustly claimed by others since the Gold Rush in California. Despite court rulings in favor of the Tribes' Water Rights for Owens Valley and the work of OVIWC to negotiate with the City of Los Angeles Department of Water and Power (LADWP) and other entities regarding water rights, the Federal Reserved Indian Water Rights remain unresolved, and negotiations have been unsuccessful in reaching an acceptable settlement of water rights.

Owens Dry Lakebed is the largest source of PM10 in the United States, emitting 30 tons of arsenic and 9 tons of cadmium, which are respectively, a known and probable carcinogen. Even relatively low concentrations of PM10 are linked to asthma, lung disease, heart attacks and arrhythmias in people with heart disease, and premature death.

Map 1 – Owens Valley Tribal Consortium – Reservation Locations



2.2 Bishop Paiute Tribe

The Bishop Paiute Reservation ("Bishop Reservation") is home to the fifth largest tribe in California, the "Paiute-Shoshone Indians of the Bishop Community of the Bishop Colony" (Bishop Paiute Tribe). The Tribe has approximately 2,000 enrolled members and is federally recognized. The Bishop Paiute Reservation resides on 875 acres and has a population of approximately 2,000 residents in 650 housing units. While most of the land serves as a residential area, there are also tribal administrative facilities, state and federal government offices, and some commercial buildings. Interstate Highway 395 borders the northern side of the Reservation and CA-Highway 168 bisects it into northern and southern portions. The City of Bishop borders the Reservation immediately to the east.

In 1912, 67,000 acres of land in Owens Valley was reserved by the U.S. Government for the Tribal Peoples in this area. However, it was revoked in 1932 by President Hoover and instead, the lands were placed in watershed protection status for the City of Los Angeles. Finally, in 1936, the federal government and the City of Los Angeles conducted a land trade, the Land Exchange Agreement of June 24, 1939, which resulted in the loss of remaining lands in lieu of the current 875 acres that make up Bishop Paiute Reservation today.

Natural Features

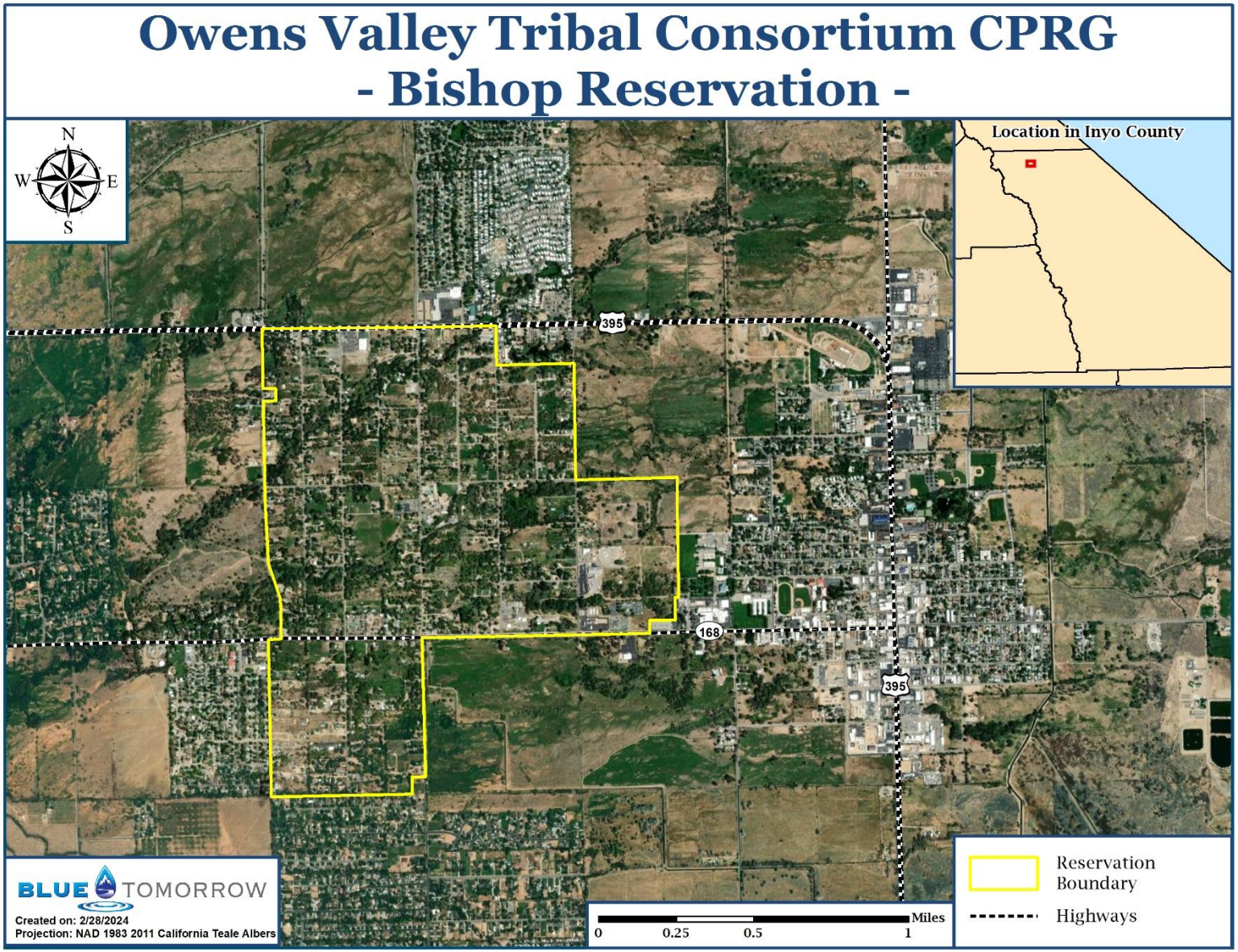
The Bishop Reservation is located on the northern side of Owens Valley between the Sierra Nevada and White Mountain Ranges. The region experiences hot, dry summers and very cold winters with occasional rain and snow. The northern and southern forks of Bishop Creek run through the Reservation, providing consistent perennial flow. The flow of Bishop Creek is primarily supplied by snowmelt runoff and influenced by upstream dams and diversions. It is likely that these streams contribute to the recharge of groundwater tables beneath the Reservation. LADWP is also required to provide 3,500-acre feet of water that is mostly used for irrigation purposes of pasturelands and yards on the Reservation.

At the time the Reservation was put in trust for the Tribe, nearly all the acreage had been cultivated by Euro American settlers since the 1860s but was taken out of production in the 1920s when Los Angeles became the landowner. Currently, much of the Reservation has been developed for residential and commercial use. For residential use, approximately half-acre land assignments are held by Tribal members, who use the land for housing, gardening, lawn and landscaping, small-scale agriculture with pasture areas, and storage. The groundwater table beneath the Reservation is near the surface. There are commercial facilities on some lands, and a 24.8-acre tract of wetland on the southern side of the east side of the Reservation which is designated as a Conservation Open Space Area (COSA) used for conservation, research, education, and outdoor recreation. Within the COSA, there is a half mile walking trail that is open to the public for recreation.

Facilities and Enterprises

Wanaaha Casino opened in 2020 to replace the existing Paiute Palace Casino. It is located right off Interstate Highway 395, in the northern area of the Reservation. It occupies approximately 28,800 square feet and has over 500 slot machines, table games, poker, a restaurant with bar and grill, a sports lounge, a player's club, and a gift shop. Other facilities on the Bishop Reservation include a health center, two gas stations, administrative office buildings, a gym, a cultural center, a preschool, education and developmental services buildings, a courthouse and police station, maintenance and utilities offices, a radio building, and a DMV office.

Map 2 – Bishop Reservation



2.3 Big Pine Paiute Tribe

The Big Pine Paiute Tribe is federally recognized (Big Pine Paiute Tribe, 2024), and its Peoples consist of three different groups, the Tovowahazi of Tovowahamatü, the Panapitahahnwitü of Panapita, and the Tunigahahnwitü of Tunigawitü (Steward, 1933). Collectively, they are known as the Big Pine Nümü or the Big Pine Paiute. Historically, the Big Pine Paiute maintained and stewarded the area of Owens Valle bordered by Keogh's Hot Springs and Fish Springs in the north and south, and the White and Sierra Nevada ranges on the east and west, respectively. However, the traditional lands have since been appropriated for use as agricultural properties, commercial properties, non-Tribal residencies, and most notably, for water rights and pumping by the LADWP (BPPT, 2022). Most of the historic Big Pine Paiute territory is now owned by LADWP.

The current lands of the Big Pine Paiute Tribe ("Big Pine Reservation") are on 299 acres directly adjacent to the town of Big Pine, California, located in northern Inyo County. The largest parcel is 279 acres but an additional 20 acres of land across two parcels was acquired from LADWP in 1989. The smaller western parcel is the site of the Tribe's domestic water tank, and the larger western parcel is the site of the wastewater treatment ponds. Interstate Highway 395 runs due north and south through the main parcel of the Reservation. In 2022, it had a population of 480 residents and approximately 200 occupied housing units (BPPT, 2022).

Natural Features

Big Pine Reservation is located within Owens Valley. The Sierra Nevada Mountains border it on the west and the White Mountains and Inyo Mountains on the east. The Reservation occupies a largely undeveloped and rural valley. It experiences a Great Basin High Desert climate which typically experiences hot, dry summers and snowy winters.

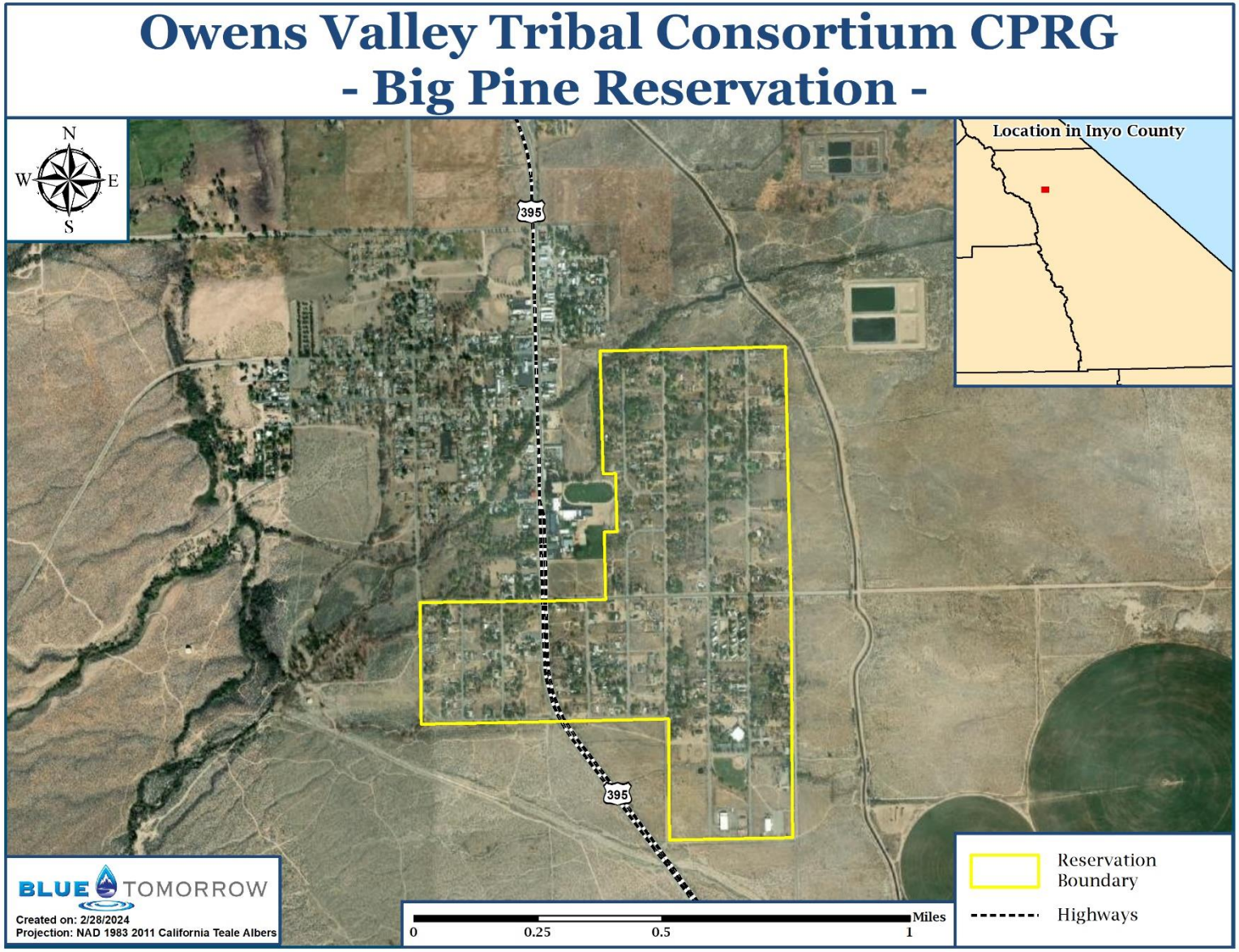
Due to insufficient precipitation to match the pumping rate of LADWP, water tables have continued to decline, significantly impacting the physical environment, vegetation, wildlife, and human health on Big Pine Reservation. High winds and drought conditions have led to increased soil erosion and uprooting of native vegetation on the Reservation and its surrounding areas. Wetland areas and springs have largely disappeared due to the lowering water table and a lack of sustained rainy seasons. Wildfires are of growing concern as they become exacerbated by drought, high wind conditions, and dry vegetation. The dry soil and increasingly barren lands lead to more frequently occurring plumes of dust that negatively impact air quality. A growing number of cases of asthma and other breathing issues have been observed in both adults and children on the Reservation (BPPT, 2022).

Facilities and Enterprises

The Reservation is predominantly residential, housing both Tribal and non-tribal residents. In 2020, the Reservation had 181 permanent residences and 27 mobile home units for a total of 208 households, with each occupying about 0.5 acres. Additionally, there are four commercial buildings, a gym, administrative buildings, a utility office and garage, a wellness center, and department office buildings on the main parcel of Big Pine Indian Reservation. The wastewater treatment ponds are approximately

0.2 miles east of the main parcel on Reservation land. Notably, a Transfer Station operated by Inyo County Solid Waste is located one mile south of and dedicated to the community of Big Pine, and the Inyo County Landfill is located less than one mile east of the Reservation's eastern boundary. The closest industrial site is the Perlite mine that is located 7 miles south.

Map 3 – Big Pine Reservation



2.4 Lone Pine Paiute-Shoshone Tribe

The Lone Pine Paiute-Shoshone Tribe established the Lone Pine Paiute-Shoshone Reservation ("Lone Pine Reservation") in 1937 through a land exchange between the U.S. Department of Interior and the City of Los Angeles. It occupies 237 acres of land in the southern portion of Owens Valley between the Inyo Mountains and Mount Whitney, on the east and west, respectively. The Reservation is nestled within the town of Lone Pine, which was founded during the height of the Gold Rush in California, in 1861. Interstate Highway 395 runs north-south through the Reservation. It has a population of 252 residents and 112 housing units that, on average, occupy 1,100 square feet.

Natural Features

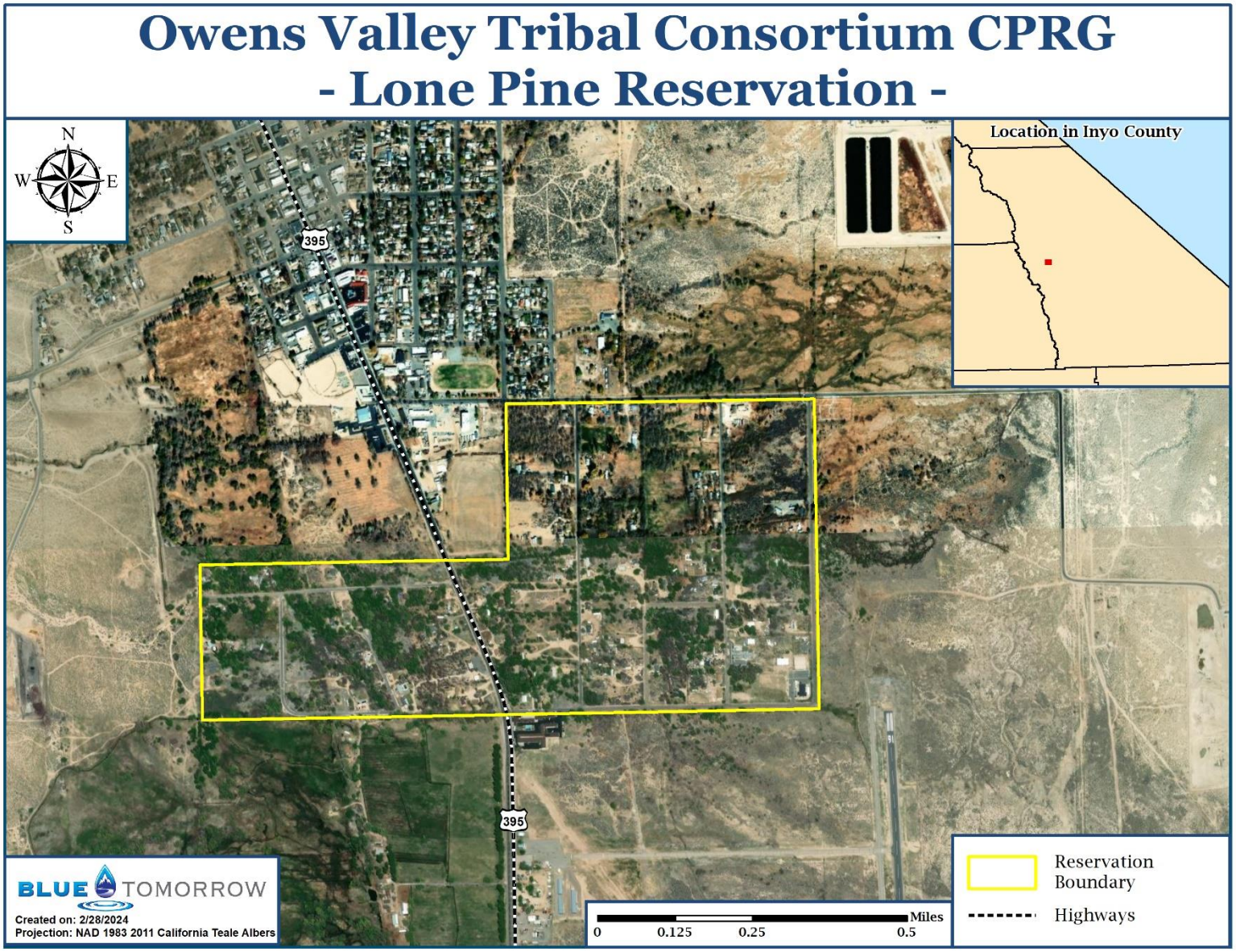
Lone Pine Reservation is the southernmost located Reservation in the Owens Valley. Climatic conditions are similar to Big Pine and Bishop Reservations, resembling a Great Basin semi-arid high desert with hot, dry summers and moderately cold winters. Annual precipitation is typically less than 5 inches, falling mostly as rain and light snow. Lone Pine Creek runs through the west side of the Reservation. Of the three Reservations in Owens Valley, Lone Pine Reservation is nearest to and approximately 5 miles north of Owens Dry Lakebed. The lakebed covers approximately 100 square miles.

The Owens Valley fault occurs along a line east of the Sierra Nevada escarpment. In 1872, Lone Pine experienced an earthquake that was estimated to have a magnitude of 7.4–7.9 on the Richter scale and devastated the region. Of the sixty to eighty buildings constructed of adobe or stone, 52 collapsed and 27 people were killed (Berkely Seismology Lab, 2019).

Facilities and Enterprises

Lone Pine Reservation consists mainly of undeveloped land, which is used for residential purposes. Other than housing units, buildings on the Reservation include administrative office buildings, three warehouses, several commercial buildings, a utility building, a wellness center, a gym, and a clinic. Lone Pine Airport is just outside of the Reservation boundaries, less than 0.5 miles to the southeast.

Map 4 – Lone Pine Reservation



3.0 GHG EMISSIONS INVENTORIES

This section provides a narrative of methods used for the calculation of emissions and sinks on each Tribe in the OVTC. The emissions inventory is organized by the following sources, where applicable: electricity use, point sources, non-point sources, on-road mobile sources, non-road mobile sources, agriculture and land management, solid waste generation, water imports, urban forestry, and wastewater processing. These sources may be made up of multiple sectors, for example, electricity consumption is broken down into commercial and residential sectors, while point sources are broken down into electricity generation and commercial sectors. The specific calculation methodology for each of these sectors can be found in the GHG Emissions Inventory Methodology section of the appendix (Section 7.1).

The quantified emissions are also categorized by the following sectors: residential, commercial, and mixed. The residential sector is comprised of only emissions related to the people living within the boundaries of the respective reservation. The commercial sector is comprised of for-profit businesses and governmental/administrative/institutional enterprises. The electricity generation sector only includes emissions pertaining to the generation of electricity within the reservation boundaries. This does not include electricity purchased from the grid, which is generated elsewhere. The mixed sector emissions are those which could not be easily separated into any of the above-mentioned sectors. For example, some wastewater treatment and on-road mobile calculations are based on both the commercial and residential sectors, so these emissions will fall into the “mixed” sector.

This emissions calculations section outlines the steps taken to calculate each source of GHG emissions on each Reservation. Wherever possible, data sources and estimation tools are cited and described below. Tools that were utilized most frequently include the Tribal Greenhouse Gas Inventory Tool (TGIT) (EPA, 2010), the U.S. Energy Information Administration Commercial Building Energy Consumption Survey (CBECS) (EIA, 2024), and the EPA’s Waste Reduction Model (WARM) (EPA, 2024).

It is important to note that, due to the absence of some reservation-specific data, numerous estimations were based on county or national averages across different sources and sectors. Although these estimates offer a provisional overview of emissions on the reservations, it is advisable to enhance their accuracy by integrating more specific data as it becomes available for the CCAP.

3.1 Bishop Paiute Tribe

The total estimated annual greenhouse gas emissions derived from the Bishop Paiute Reservation in the base year 2022 is 9,094 MTCO2e (Table 1). Within the Bishop Reservation, the primary sources of emissions are stationary non-point sources (Figure 1). The Bishop Reservation plans to implement priority measures that are focused on reducing greenhouse gas emissions that result from electricity consumption, wood burning stoves, and propane use by shifting toward renewable energy sources.

Table 1 – Bishop Reservation Total Emissions by Sector and Source in Metric Tons of CO2 Equivalent

	Source					
Sector	**Electricity**	**Non-point Sources**	**On-road Mobile**	**Solid Waste**	**Wastewater**	**Total**
Commercial	638	1,377.0	-	4.3	-	2,019.3
Residential	948	5,185.8	39.4	123.0	-	6,296.2
Mixed	-	-	-	-	778.4	778.4
Total	1,586	6,562.8	39.4	127.3	778.4	9,093.9

If emissions are combined into their source category groups (Figure 1, Table 2), stationary non-point sources contribute the most to the total emissions on the Reservation (72.2%). The second largest combined source category is electricity consumption (17.4%), followed by wastewater treatment (8.6%), solid waste generation (1.4%), and on-road mobile sources (0.4%). When grouped by sector, the greatest emissions were attributed to the residential sector (Figure 2, Table 3).

The per capita annual emissions for residents of Bishop Reservation are 4.5 MTCO2e. The majority of GHG emissions (69.2%) were generated within the residential sector. For comparison, the Inyo County average per capita annual emissions in 2022 was 29.7 MTCO2e (EPA, 2024). In the Comprehensive Climate Action Plan (CCAP) emissions inventory, emissions will be further broken down by sector to calculate per capita averages with higher specificity and accuracy.

Within the CCAP, more detailed data on energy use and emissions will be collected from both commercial and residential buildings, including, but not limited to, stationary non-point sources, mobile sources, and wastewater treatment plants. The CCAP will aim to provide a more comprehensive and accurate emissions profile for the Bishop Paiute Reservation.

Figure 1 – Bishop Reservation Emissions (MTCO2e) by Source

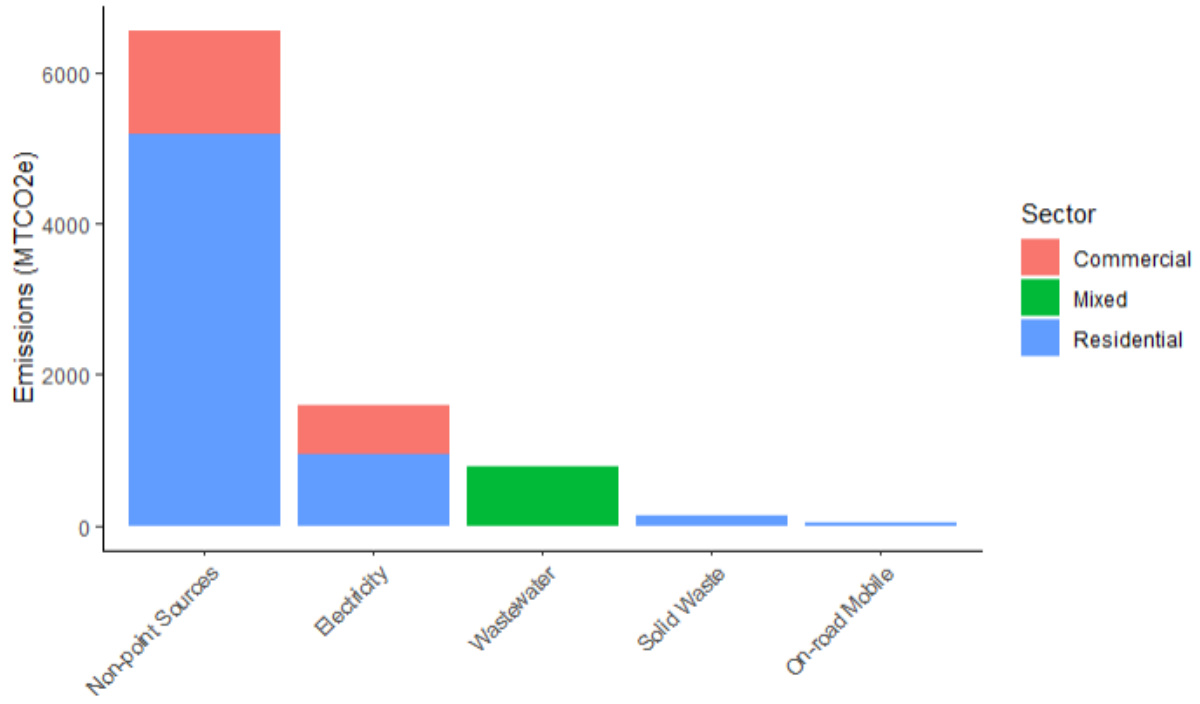


Table 2 – Bishop Reservation Emissions Percentages by Source

Source	Emissions	Percent
Non-point Sources	6,562.8	72.2%
Electricity	1,586.0	17.4%
Wastewater	778.4	8.6%
Solid Waste	127.3	1.4%
On-road Mobile	39.4	0.4%

Figure 2 – Bishop Reservation Emissions (MTCO2e) by Sector

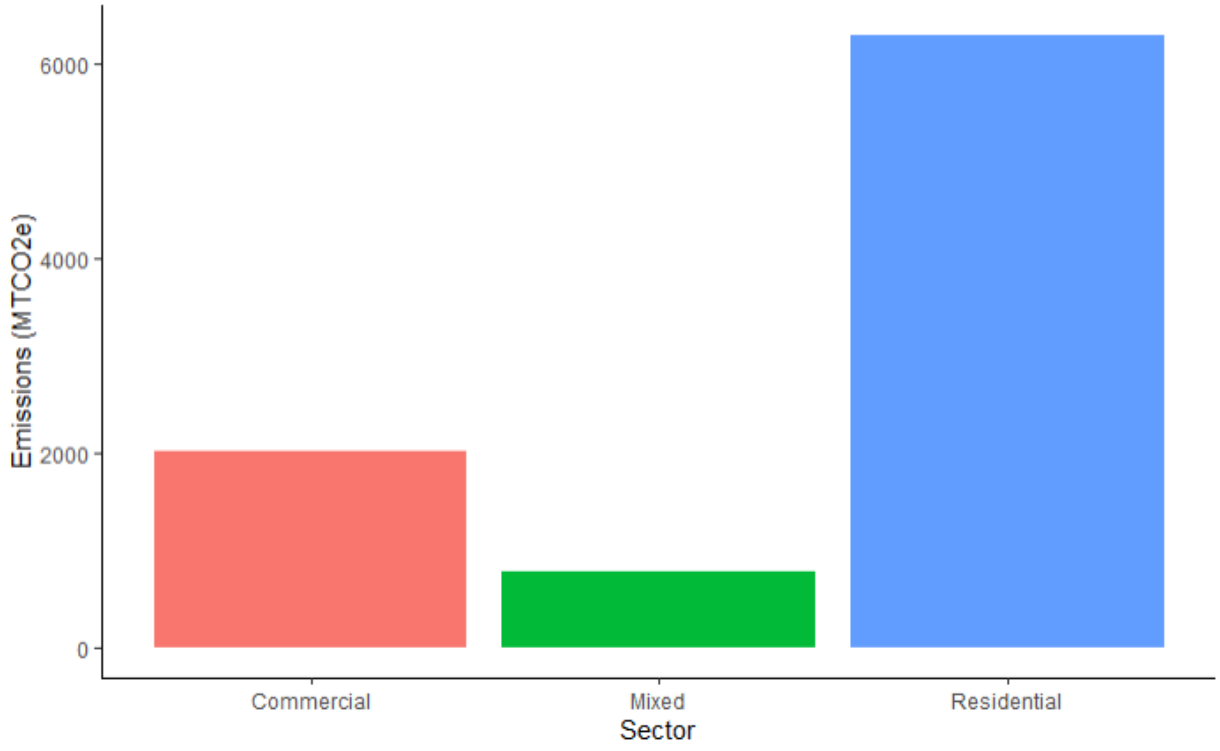


Table 3 – Bishop Reservation Emissions Percentage by Sector

Sector	Emissions	Percent
Residential	6,296.15	69.2%
Commercial	2,019.30	22.2%
Mixed	778.38	8.6%

3.2 Big Pine Paiute Tribe

The total estimated annual greenhouse gas emissions derived from the Big Pine Reservation in the base year 2022 is 6,619 MTCO2e (Table 4). Within the Big Pine Reservation, the primary sources of emissions are on-road mobile sources, non-point sources, and electricity consumption, with the on-road mobile contributing the highest emissions among all individual sources (Figure 3, Table 5). The Big Pine Reservation is strategizing to implement reduction measures specifically aimed at decreasing GHG emissions originating from on-road mobile sources, electricity production, and propane consumption by increasing energy efficiency of buildings and transitioning to renewable energy sources to meet the Reservation's energy requirements.

Table 4 – Big Pine Reservation Total Emissions by Sector and Source in Metric Tons of CO2 Equivalent

	Source						
Sector	**Electricity**	**Non-point Sources**	**Non-road Mobile**	**On-road Mobile**	**Solid Waste**	**Wastewater**	**Total**
Commercial	61.4	209.7	6.0	10.4	29.4	-	316.9
Residential	244.6	1,440.6	-	4,479.8	127.0	10.3	6,302.3
Total	306	1,650.3	6.0	4,490.2	156.4	10.3	6,619.2

The residential sector, rather than the commercial sector, produces most emissions on Big Pine Reservation, contributing to 95.2% of its inventoried emissions (Figure 4, Table 6). The greatest source of emissions is from on-road mobile sources, accounting for 67.8% of total emissions, followed by non-point sources (24.9%), *Scope 2* emissions from electricity usage (4.6%), solid waste (2.4%), *Scope 3* emissions from wastewater treatment (0.2%), and finally, by non-road mobile sources (0.1%).

The per capita annual emissions for residents of Big Pine Reservation are 13.8 MTCO2e. For comparison, the Inyo County average per capita annual emissions in 2022 was 29.7 MTCO2e (EPA, 2024). In the Comprehensive Climate Action Plan (CCAP) emissions inventory, emissions will be further broken down by sector to calculate per capita averages with higher specificity and accuracy.

Within the CCAP, more detailed data on energy use and emissions will be collected from both commercial and residential buildings, including, but not limited to, stationary non-point sources, mobile sources, and wastewater treatment plants. The CCAP will aim to provide a more comprehensive and accurate emissions profile for the Big Pine Reservation.

Figure 3 – Big Pine Reservation Emissions (MTCO2e) by Source

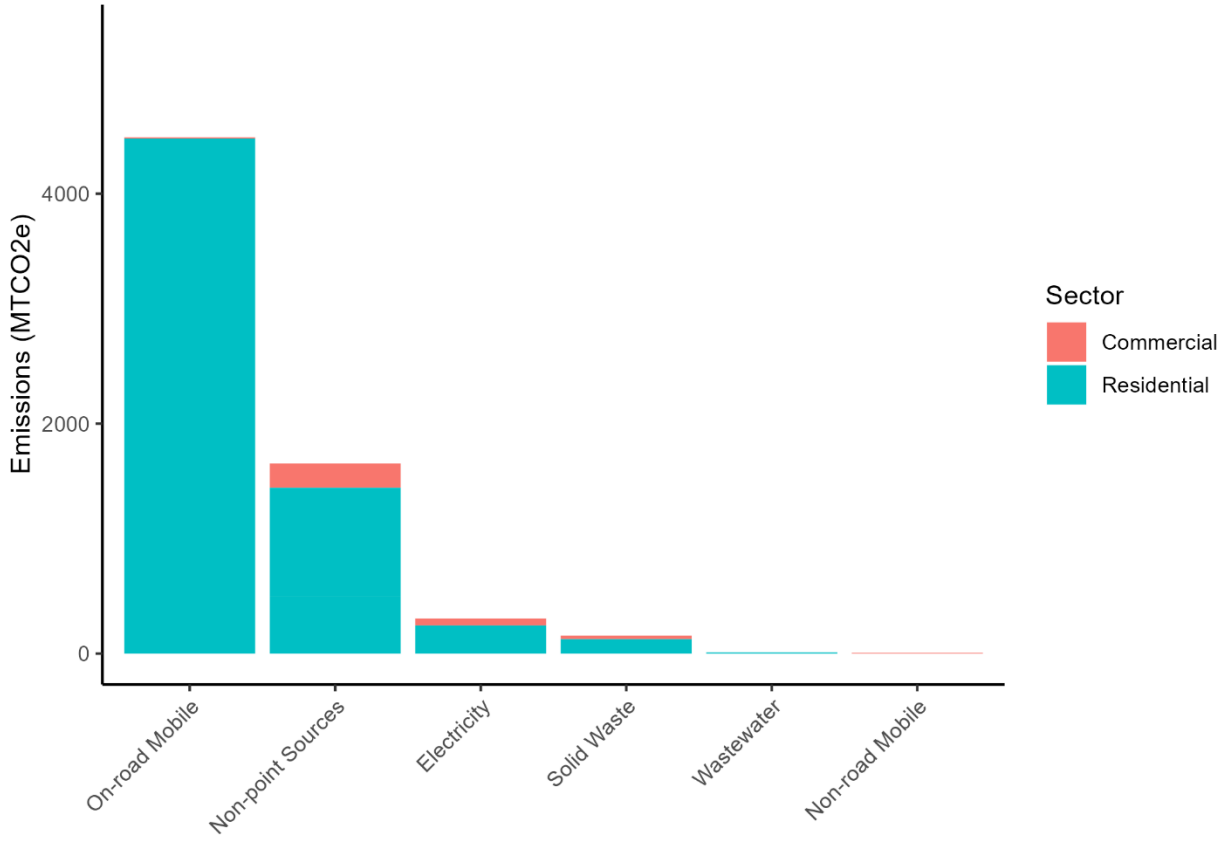


Table 5 – Big Pine Reservation Emissions Percentages by Source

Source	Emissions	Percent
On-road Mobile	4,490.2	67.8%
Non-point Sources	1,650.3	24.9%
Electricity	306.0	4.6%
Solid Waste	156.4	2.4%
Wastewater	10.3	0.2%
Non-road Mobile	6.0	0.1%

Figure 4 – Big Pine Reservation Emissions (MTCO2e) by Sector

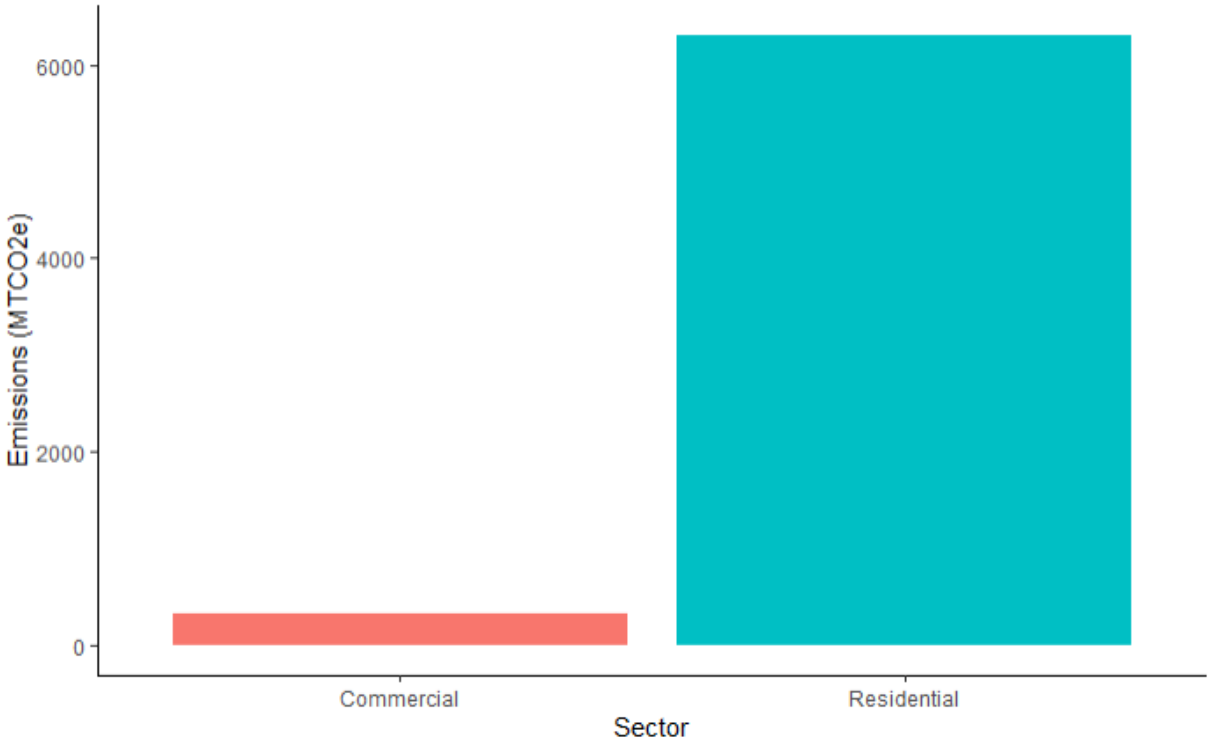


Table 6 – Big Pine Reservation Emissions Percentages by Sector

Sector	Emissions	Percent
Residential	6,302.29	95.2%
Commercial	316.9	4.8%

3.3 Lone Pine Paiute-Shoshone Tribe

The total estimated annual greenhouse gas emissions derived from the Lone Pine Reservation in the base year 2022 is 4,056 MTCO2e (Table 7). Within the Lone Pine Reservation, the primary sources of emissions are on-road mobile sources, non-point sources, and electricity consumption, with the on-road mobile contributing the highest emissions among all individual sources (Figure 5, Table 8). The Lone Pine Reservation is strategizing to implement reduction measures specifically aimed at decreasing greenhouse gas (GHG) emissions originating from on-road mobile sources, electricity use, and propane consumption by transitioning towards renewable energy sources to meet the Reservation's energy requirements.

Table 7 – Lone Pine Reservation Total Emissions by Sector and Source in Metric Tons of CO2 Equivalent

	Source					
Sector	**Electricity**	**Non-point Sources**	**On-road Mobile**	**Solid Waste**	**Wastewater**	**Total**
Commercial	151.3	242.1	80.2	39.5	-	513.1
Residential	248	875.5	2,351.9	77.3	5.4	3,558.1
Total	399.3	1,117.6	2,432.1	116.8	5.4	4,071.2

The residential sector, rather than the commercial sector, produces most emissions on Lone Pine Reservation, contributing to 87.7% of its inventoried emissions. (Figure 6, Table 9) The greatest source of emissions is from on-road mobile sources, accounting for 60% of total emissions, followed by non-point sources (27.3%), *Scope 2* emissions from electricity usage (9.8%), solid waste hauling (2.9%), and finally, by *Scope 3* emissions from wastewater treatment (0.1%).

The per capita annual emissions for residents of Lone Pine Reservation are 16.1 MTCO2e. For comparison, the Inyo County average per capita annual emissions in 2022 was 29.7 MTCO2e (EPA, 2024). In the Comprehensive Climate Action Plan (CCAP) emissions inventory, emissions will be further broken down by sector to calculate per capita averages with higher specificity and accuracy.

Within the CCAP, more detailed data on energy use and emissions will be collected from both commercial and residential buildings, including, but not limited to, stationary non-point sources, mobile sources, and wastewater treatment plants. The CCAP will aim to provide a more comprehensive and accurate emissions profile for the Lone Pine Reservation.

Figure 5 – Lone Pine Reservation Emissions (MTCO2e) by Source

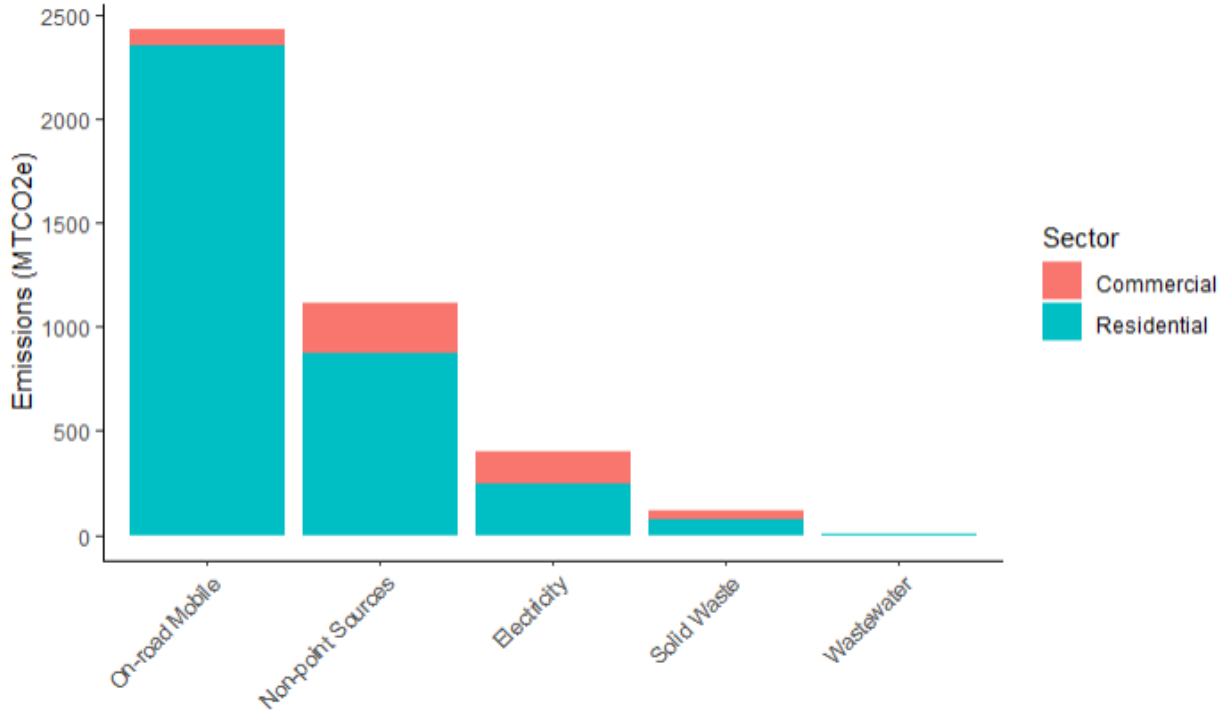


Table 8 – Lone Pine Reservation Emissions Percentages by Source

Source	Emissions	Percent
On-road Mobile	2,432.1	60%
Non-point Sources	1,117.6	27.3%
Electricity	399.3	9.8%
Solid Waste	116.8	2.9%
Wastewater	5.4	0.1%

Figure 6 – Lone Pine Reservation Emissions (MTCO2e) by Sector

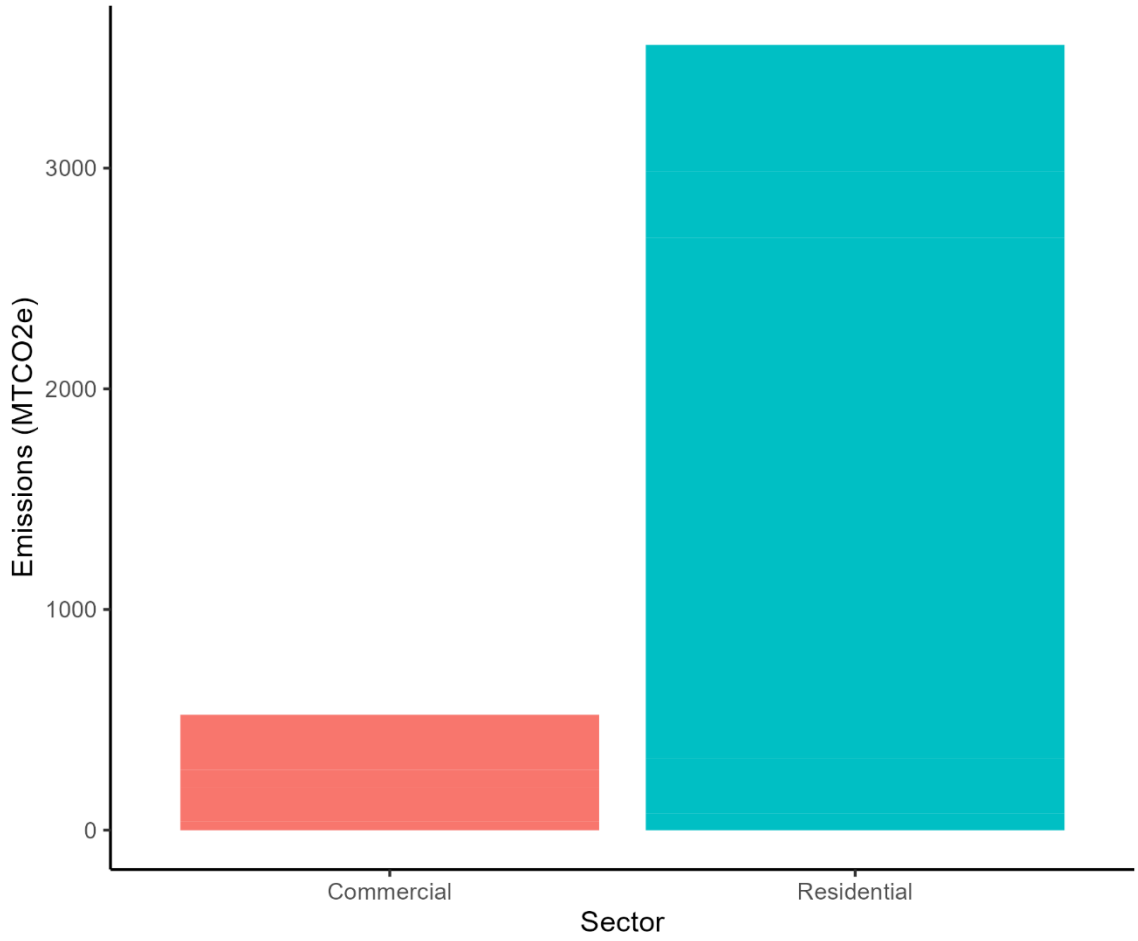


Table 9 – Lone Pine Reservation Emissions Percentages by Sector

Sector	Emissions	Percent
Residential	3,558.1	87.7%
Commercial	513.1	12.3%

4.0 QUANTIFIED REDUCTION MEASURES

This section provides information on the GHG reduction priority measures chosen by the Tribes of the OVTC and a quantified estimate of the GHG reductions that would be achieved if implemented. The following information is provided for each reduction measure: estimate of the quantifiable GHG emissions reductions, implementing agency, implementation schedule and milestones, milestones for obtaining implementing authority as appropriate, geographic location, metrics for tracking progress, and the applicable sector. Refer to Section 7.2 in the appendix for an explanation of how these GHG reduction measures were quantified and the assumptions used.

GHG reduction measures were prioritized based on the alignment with projects already in progress, the benefits for the community, maximum GHG emissions reductions, and the goals of the Tribal governments. In order to choose projects to propose in this PCAP, each Tribe conducted outreach to stakeholders and residents via social media and in-person meetings. Determining the feasibility of these projects involved interdepartmental communication and collaboration, along with occasional Tribal Council and elder meetings.

4.1 Bishop Paiute Tribe

The Bishop Paiute Tribe identified four (4) priority GHG reduction measures for the PCAP (Table 10).

Table 10 – Bishop Reservation Priority GHG Reduction Measures

Source	Priority Reduction Measures
Transportation	1. Tribal Fleet Electrification
Electricity	2. Microgrid for Community Buildings Complex 3. Microgrid for Professional Center 4. Air-Source Heat Pumps for Residential Sector 5. Community Solar Virtual Grid

1. Tribal Fleet Electrification

The Bishop Paiute Tribe plans to replace 25% of the vehicles from the existing fleet, which includes both gasoline and diesel-powered vehicles, with all-electric vehicles (EVs). The Bishop Paiute Tribal fleet is currently made up of 80 government-operated on-road vehicles. By switching 20 of these vehicles to electric, it is anticipated that GHG emissions will be reduced by 98 MTCO2e. This estimate does not consider the upstream emissions associated with the production of EVs and their batteries.

Measure #1: Tribal Fleet Electrification	
Description	Replacement of 20 existing Tribal fleet vehicles, composed of gasoline and diesel-powered vehicles, with electric vehicles. Implementation will prioritize older vehicles. This measure will act to reduce GHG emissions attributed to on-road mobile sources within the Reservation by the commercial sector.
Annual Estimated GHG Emissions Reductions	98 MTCO2e/year
Implementing Agency/Agencies	Bishop Environmental Management Office
Milestones for Obtaining Implementing Authority	Tribal Council Approval
Implementation Schedule	Year 1: Replace 7 Tribal fleet vehicles Year 2: Replace 7 Tribal fleet vehicles Year 3: Replace 6 Tribal fleet vehicles
Geographic Location	Bishop Reservation
Metrics Tracking Progress	1. Number of Tribal fleet vehicles replaced with EVs per year 2. Annual reduction of GHG emissions
Applicable Source	Transportation and electricity generation/consumption

2. Microgrid for Community Buildings Complex

The Bishop Paiute Tribe proposes to install a microgrid at its community complex. A solar microgrid is a localized electrical grid which uses solar energy for power. Solar panels generate electricity which is transferred to large backup batteries that can deliver stored power at a later time. This is useful because electricity from mainstream grid distributors costs more during on-peak hours, when the demand for electricity is higher. During these times, the microgrid batteries can supply necessary electricity so that there will be a larger cost savings associated with using solar energy. This is called 'peak-shaving.' Another functionality of solar microgrids is 'net-metering' which means that in the event the solar panels generate more electricity than the consumer needs, the microgrid can sell electricity back to the mainstream grid supplier. This can significantly offset electricity bills. Microgrids systems offer resilience to power outages by supplying locally generated electricity.

The two parking lots in the complex provide enough space to install solar canopies that cover a maximum area of 72,000 square feet. Under optimal conditions, a microgrid deployed at these locations would generate enough electricity to exceed the complex's requirements, producing over 3 million kWh per year. The solar microgrid is large enough to generate power for the entire complex, as well as

generate surplus energy to sell back to the grid. The total emissions reduced from the generation of electricity including that which is sold back to the grid would be 782 MTCO2e.

Measure #2: Microgrid for Community Buildings Complex	
Description	Deploy a microgrid to provide the community buildings complex with energy independence and resilience. Additionally, maintain power during grid disruptions. Electricity will be generated by solar panels installed as canopies for two parking lots and stored locally on batteries and/or generators to meet electricity requirements of the community complex. Excess energy generated can be sold to SCE to further reduce Scope 2 emissions.
Annual Estimated GHG Emissions Reductions	Up to 782 MTCO2e/year
Implementing Agency/Agencies	Bishop Environmental Management Office
Milestones for Obtaining Implementing Authority	Tribal Council Approval and Cultural Monitoring
Implementation Schedule	Years 1-2: Microgrid Deployment Planning Year 3-5: Microgrid Deployment, Installation, and Net Metering
Geographic Location	Community Complex
Metrics Tracking Progress	1. Number of solar panels installed 2. Number of batteries/generators installed 3. Annual electricity savings from microgrid deployment 4. Net metering rates
Applicable Source	Electricity generation/consumption

3. Microgrid for Bishop Paiute Professional Center

The Bishop Paiute Tribe proposes to install a microgrid at its professional center. A solar microgrid is a localized electrical grid which uses solar energy for power. Solar panels generate electricity which is transferred to large backup batteries that can deliver stored power at a later time. This is useful because electricity from mainstream grid distributors costs more during on-peak hours, when the demand for electricity is higher. During these times, the microgrid batteries can supply necessary electricity so that there will be a larger cost savings associated with using solar energy. This is called 'peak-shaving.' Another functionality of solar microgrids is 'net-metering' which means that in the event that the solar panels generate more electricity than the consumer needs, the microgrid can sell electricity back to the mainstream grid supplier. This can significantly offset electricity bills. Microgrids systems offer resilience to power outages by supplying locally generated electricity.

The parking lot serving the professional center provides enough space to install solar canopies that cover a maximum area of 105,000 square feet. Under optimal conditions, a microgrid deployed at these locations would generate enough electricity to exceed the complex's requirements, producing over 3.6 million kWh per year. The solar microgrid is large enough to generate power for the entire center, as well as generate surplus energy to sell back to the grid. The total emissions reduced from the generation of electricity including that which is sold back to the grid would be 909 MTCO2e.

Measure #3: Microgrid for Professional Center	
Description	Deploy a microgrid to provide the Professional Center with energy independence and resilience. Additionally, maintain power during grid disruptions. Electricity will be generated by solar panels installed as a canopy for the parking lot and stored locally on batteries and/or generators to meet electricity requirements of the Professional Center. Excess energy generated can be sold to SCE to further reduce Scope 2 emissions.
Annual Estimated GHG Emissions Reductions	Up to 909 MTCO2e/year
Implementing Agency/Agencies	Bishop Environmental Management Office
Milestones for Obtaining Implementing Authority	Tribal Council Approval and Cultural Monitoring
Implementation Schedule	Years 1-2: Microgrid Deployment Planning Year 3-5: Microgrid Deployment, Installation, and Net Metering
Geographic Location	Professional Center
Metrics Tracking Progress	1. Number of solar panels installed 2. Number of batteries/generators installed 3. Annual electricity savings from microgrid deployment 4. Net metering rates
Applicable Source	Electricity generation/consumption

4. Air-Source Heat Pumps for Residential Sector

The residents of the Bishop Reservation primarily use woodstoves for heating their homes, and air conditioning to cool them. The Tribe aims to enhance energy efficiency of the residential sector through the installation of air source heat pumps for 650 homes on the Reservation. Air source heat pumps provide both heating and cooling for households and are much more energy efficient than traditional air conditioning units, transferring heat between a home and the outside air (U.S. Department of Energy,

2024). Based on the analysis and assumptions outlined in Section 7.2.1, the installation of air-source heat pumps could reduce GHG emissions by 2,622 MTCO2e.

Measure #4: Air-Source Heat Pumps for Residential Sector	
Description	Aim to install 650 homes with air-source heat pumps to increase energy efficiency and reduce emissions caused from heating and cooling. Homes would also be fit with energy metering to monitor energy use and savings.
Estimate of the quantifiable GHG emissions reductions	2,622 MTCO2e/year
Implementing agency/agencies	Bishop Environmental Management Office
Milestones for obtaining implementing authority	Tribal Council Approval
Implementation schedule and milestones	Years 1-2: Education and outreach to residents encouraging transition to heat pumps for home heating Years 3-4: 25% of Tribal homes installed with heat pumps Years 5+: 25-100% of Tribal homes installed with heat pumps
Geographical location	Bishop Reservation
Metrics for tracking progress	1. Number of homes retrofitted per year 2. Average annual energy savings per home 3. Tribal member satisfaction surveys
Applicable sector	Electricity generation/consumption

5. Community Solar Project

The Bishop Paiute Tribe is looking to fully offset the residential electricity use from 540 homes on the Reservation through a community solar project with virtual net metering capabilities. Due to technical and economic limitations, some homes on the Reservation are not able to install solar panels directly on their properties. However, it is still possible to offset the electricity use from their homes through a virtual community solar grid with virtual net metering or feed-in tariff capabilities (depending on feasibility). This directly addresses the environmental justice issue of equal access to renewable energy. A virtual solar grid is one that is installed at a centralized location, and residents have the opportunity to subscribe to a portion of the energy generated at that site. The electricity generated at the site is fed into the grid, and each subscriber receives credits on their electricity bill based on the size of their subscription.

The Tribe would like to dedicate a developed area such as the Bishop Paiute Tribe Commercial Park to install enough solar panels to offset the emissions of at least 540 residential homes on the Reservation. Surplus energy generated by this solar project can be used to offset energy bills in commercial buildings as well. By implementing this GHG reduction measure, the Bishop Paiute Tribe would reduce their emissions by 1,164 MTCO2e.

Measure #5: Community Solar Project	
Description	Install a solar grid on developed land with enough capacity to power 540 homes. This solar grid will have virtual capabilities in order to offset emissions and electricity bills from these homes. This will be accomplished via virtual net metering or feed-in tariffs, depending on feasibility.
Estimate of the quantifiable GHG emissions reductions	1,164 MTCO2e /year
Implementing agency/agencies	Bishop Environmental Management Office
Milestones for obtaining implementing authority	Tribal Council Approval
Implementation schedule and milestones	Years 1-2: Virtual solar grid deployment planning Year 3-5: Virtual solar grid installation, deployment, and virtual net metering
Geographical location	Bishop Reservation
Metrics for tracking progress	1. Number of solar panels added to the virtual grid 2. Average annual energy savings per home 3. Emissions avoided
Applicable sector	Electricity generation/consumption

4.2 Big Pine Paiute Tribe

The Big Pine Paiute Tribe identified four (4) priority GHG reduction measures for the PCAP (Table 11).

Table 11 – Big Pine Reservation Priority GHG Reduction Measures

Source	Priority Reduction Measures
Transportation	1. Charging Station Installation
Electricity	2. Energy Audits and Retrofits 3. Solarized Tribal Homes 4. Solar Parking Canopy

1. Charging Station Installation

The Big Pine Paiute Tribe proposes to install several EV charging stations at the Tribal Administrative Building parking lot. Currently, there are no charging stations within the Reservation boundaries. Given the increasing prevalence of EVs in California, there is a significant and growing need for more charging facilities, particularly in rural areas where public charging stations are few and far in between. In response to this demand, this reduction measure aims to create charging infrastructure on the Reservation by installing three Level 2 chargers near the administrative buildings. The use of charging stations is recommended to be offered at no charge to Tribal members to further encourage residents to transition from traditional vehicles to EVs. Assuming the chargers are in use 12 hours per day, this measure has the potential reduce up to 69.7 MTCO2e per year. Costs associated with this measure would include the purchase and installation of EV chargers and associated infrastructure.

Measure #1: Charging Station Installation	
Description	Install 3 Level 2 chargers on the Reservation. Chargers will be installed in high-use areas of the Reservation such as by the administrative buildings.
Annual Estimated GHG Emissions Reductions	69.7 MTCO2e/year
Implementing Agency/Agencies	Big Pine Environmental Department
Milestones for Obtaining Implementing Authority	Tribal Council Approval and Cultural Monitoring
Implementation Schedule	Year 1: Charging Station Infrastructure Planning Year 2: Charging Station Installation
Geographic Location	Administrative Building Park
Metrics Tracking Progress	1. Number of EV charging stations installed 2. Number of miles charged by installed stations 3. Number of EVs owned by residents and Tribe
Applicable Source	Transportation and electricity generation/consumption

2. Energy Audits and Retrofits

The Big Pine Paiute Tribe aims to enhance energy efficiency of the residential sector through energy audits and retrofits. The Tribe aims to do this by equipping 184 Tribal homes with air source heat pumps and triple-pane windows. Air source heat pumps are an energy-efficient alternative to furnaces and air conditioners for all climates. They work by transferring heat between a home and the outside air (U.S. Department of Energy, 2024). Triple-pane windows are more energy efficient than double pane windows and improve insulation and minimize energy loss. Triple pane windows have a thin third pane to create two air spaces instead of one, and they also have two low-emissivity coatings that reflect radiant heat (U.S. Department of Energy, 2024). Under the assumption that, nationally, 52% of electricity use on average is devoted to heating and cooling in homes (EIA, 2023), these retrofits would result in a reduction of approximately 95 MTCO2e, relative to the national average. It would also eliminate emissions related to the use of wood stoves for residential heating. Accounting for both factors, the installation of air-source heat pumps and insular windows could reduce GHG emissions by a total of up to 1,038 MTCO2e.

Measure #2: Energy Audits & Retrofits	
Description	Conduct energy audits to identify energy-saving opportunities for Tribal homes. Aim to retrofit 184 homes with air-source heat pumps and triple-pane windows to increase energy efficiency and reduce heating & cooling loss. Homes would also be fit with energy metering to monitor energy use and savings.
Estimate of the quantifiable GHG emissions reductions	1,038 MTCO2e/year
Implementing agency/agencies	Big Pine Environmental Department
Milestones for obtaining implementing authority	None required
Implementation schedule and milestones	Year 1: 25% of Tribal homes retrofitted Year 2: 50% of Tribal homes retrofitted Year 3: 75% of Tribal homes retrofitted Year 4: 100% of Tribal homes retrofitted
Geographical location	Big Pine Reservation
Metrics for tracking progress	1. Number of homes retrofitted per year 2. Average annual energy savings per home 3. Tribal member satisfaction surveys
Applicable sector	Electricity generation/consumption

3. Solarized Tribal Homes

Big Pine Paiute Tribe is proposing to offer solarization for Tribal homes on the Reservation. This reduction measure aims to shift the residential sector towards the use of renewable energy by installing solar panels on as many as 184 homes within the Reservation. The solarization of Tribal homes would reduce emissions by up to 245 MTCO2e annually. Incorporating sufficient battery storage capacity and employing net metering, the installation of additional solar panels would generate supplemental energy. The surplus could be sold to LADWP to further reduce *Scope 2* emissions linked to off-Reservation electricity generation.

Measure #3: Solarize Tribal Homes	
Description	Offer fully funded solar panel installation for community members on homes. Goal is to retrofit all 184 homes on the Reservation with solar and net metering ability to allow homeowners to receive credit for excess electricity generated that is sold to the grid.
Estimate of the quantifiable GHG emissions reductions	245 MTCO2e/year
Implementing agency/agencies	Big Pine Environmental Department
Milestones for obtaining implementing authority	None required
Implementation schedule and milestones	Year 1: Tribal Home Solarization Planning Years 2-3: Install solar panels on 184 Tribal homes
Geographical location	Big Pine Reservation
Metrics for tracking progress	1. Energy savings from solar panels 2. Profits made from selling energy back to the grid if any
Applicable sector	Electricity Generation & Consumption

4. Solar Parking Canopy

The Big Pine Paiute Tribe proposes to install solar panels over the administrative complex parking lot along with battery storage. The parking lot serving the administrative complex provides enough space to install solar canopies that cover a maximum area of 11,500 square feet. Under optimal conditions, a solar canopy deployed at this location would generate enough electricity to exceed the complex's requirements, producing over 495,000 kWh per year. This is enough to generate power for the entire complex, as well as generate surplus energy to sell back to the grid. The emissions reduced from the implementation of this measure can be accounted for in two different ways: including only the emissions reduced from electricity consumed within the buildings served by this canopy, or including the emissions reduced from selling the maximum amount of electricity used back to the grid. The emissions reduced from the original electricity consumption of these buildings would be 61.4 MTCO2e, while the total emissions reduced from the generation of electricity that could be sold back to the grid would be 127 MTCO2e.

Measure #4: Solar Parking Canopy	
Description	Deploy a microgrid to provide the administrative complex with energy independence and resilience. Additionally, maintain power during grid disruptions. Electricity will be generated by solar panels installed as a canopy for the parking lot and stored locally on batteries and/or generators to meet electricity requirements of the administrative complex. Excess energy generated can be sold to LADWP to further reduce Scope 2 emissions.
Annual Estimated GHG Emissions Reductions	Up to 127 MTCO2e/year
Implementing Agency/Agencies	Big Pine Environmental Department
Milestones for Obtaining Implementing Authority	Tribal Council Approval and Cultural Monitoring
Implementation Schedule	Years 1-2: Solar Parking Lot Canopy Planning Year 3-5: Solar Panel Installation and Net Metering
Geographic Location	Administrative Building Park
Metrics Tracking Progress	1. Number of solar panels installed 2. Number of batteries/generators installed 3. Annual electricity savings from canopy installation 4. Net metering rates
Applicable Source	Electricity generation/consumption

Additional GHG Reduction Measures

Source	Non-Priority Reduction Measures
Buildings	1. Full Demolition and Rebuild of Administrative Building Park
Electricity	2. Microgrid for Administrative Building Park 3. Retrofit Tribal Administrative Buildings with Heat Pumps
Materials and Waste	4. Community Compost Program

4.3 Lone Pine Paiute-Shoshone Tribe

The Lone Pine Paiute Tribe identified two (2) priority GHG reduction measures for the PCAP (Table 12).

Table 12 – Lone Pine Reservation Priority GHG Reduction Measures

Source	Priority Reduction Measures
Transportation	1. Charging Station Installation
Electricity	2. Microgrid for Administrative Complex

1. Charging Station Installation

The Lone Pine Paiute Shoshone Tribe aims to install several EV charging stations at the administrative complex and other high-traffic areas. Currently, there are no charging stations within the Reservation boundaries. Given the increasing prevalence of EVs in California, there is a significant and growing need for more charging facilities, particularly in rural areas where public charging stations are few and far in between. In response to this demand, this reduction measure aims to create charging infrastructure on the Reservation by installing five Level 2 chargers. The use of charging stations is recommended to be offered at no charge to Tribal members to further encourage residents to transition from traditional vehicles to EVs. Assuming the chargers are in use 12 hours per day, this measure has the potential to reduce up to 116 MTCO2e per year. Costs associated with this measure would include the purchase and installation of EV chargers and associated infrastructure.

Measure #1: Charging Station Installation	
Description	Install 5 Level 2 chargers on the Reservation. Chargers will be installed in high-use areas of the Reservation such as by the administrative complex.
Annual Estimated GHG Emissions Reductions	116 MTCO2e/year
Implementing Agency/Agencies	Lone Pine Environmental Department
Milestones for Obtaining Implementing Authority	Tribal Council Approval and Cultural Monitoring
Implementation Schedule	Year 1: Charging Station Infrastructure Planning Year 2: Charging Station Installation
Geographic Location	Administrative Complex
Metrics Tracking Progress	1. Number of EV charging stations installed 2. Number of miles charged by installations

	3. Number of EVs owned by residents and Tribe
Applicable Source	Transportation and electricity generation/consumption

2. Microgrid for Administrative Complex

The Lone Pine Paiute Shoshone Tribe proposes to install a microgrid at its administrative complex. A solar microgrid is a localized electrical grid which uses solar energy for power. Solar panels generate electricity which is transferred to large backup batteries that can deliver stored power at a later time. This is useful because electricity from mainstream grid distributors costs more during on-peak hours, when the demand for electricity is higher. During these times, the microgrid batteries can supply necessary electricity so that there will be a larger cost savings associated with using solar energy. This is called 'peak-shaving.' Another functionality of solar microgrids is 'net-metering' which means that in the event that the solar panels generate more electricity than the consumer needs, the microgrid can sell electricity back to the mainstream grid supplier. This can significantly offset electricity bills. Microgrids systems offer resilience to power outages by supplying locally generated electricity.

The parking lot serving the administrative complex provides enough space to install solar canopies that cover a maximum area of 11,288 square feet. Under optimal conditions, a microgrid deployed at these locations would generate enough electricity to exceed the complex's requirements, producing over 486,000 kWh per year. The solar microgrid is large enough to generate power for the entire complex, as well as generate surplus energy to sell back to the grid. The emissions reduced from the implementation of this measure can be accounted for in two different ways: including only the emissions reduced from electricity consumed within the buildings served by this microgrid, or including the emissions reduced from selling the maximum amount of electricity used back to the grid. The emissions reduced from the original electricity consumption of these buildings would be 105 MTCO2e, while the total emissions reduced from the generation of electricity that could be sold back to the grid would be 125 MTCO2e.

Measure #2: Microgrid for Administrative Complex	
Description	Deploy a microgrid to provide the administrative complex with energy independence and resilience. Additionally, maintain power during grid disruptions. Electricity will be generated by solar panels installed as a canopy for the parking lot and stored locally on batteries and/or generators to meet electricity requirements of the administrative complex. Excess energy generated can be sold to LADWP to further reduce Scope 2 emissions.
Annual Estimated GHG Emissions Reductions	Up to 125 MTCO2e/year
Implementing Agency/Agencies	Lone Pine Environmental Department
Milestones for Obtaining Implementing Authority	Tribal Council Approval and Cultural Monitoring
Implementation Schedule	Years 1-2: Microgrid Deployment Planning Year 3-5: Microgrid Deployment, Installation, and Net Metering
Geographic Location	Administrative Complex – Tribal Headquarters Building
Metrics Tracking Progress	1. Number of solar panels installed 2. Number of batteries/generators installed 3. Annual electricity savings from microgrid deployment 4. Net metering rates
Applicable Source	Electricity generation/consumption

Additional GHG Reduction Measures

Source	Non-Priority Reduction Measures
Transportation	1. Electric Shuttle Program for Tribal Youth
Electricity	2. Solar-Powered Street Lighting
Carbon Sequestration	3. Invasive Plant Removal and Native Plant Revegetation
Materials and Waste	4. Community Compost Program

5.0 BENEFITS ANALYSIS

For the CPRG PCAP, the EPA does not mandate a separate benefits analysis specifically for disadvantaged communities within the Tribal CPRG framework. This approach allows Tribes to integrate considerations for all community members uniformly within their overall climate action strategies.

The benefits analysis will be split apart by sections for the three OVTC member Tribes: Bishop Paiute Tribe, Big Pine Paiute Tribe, and Lone Pine Paiute Shoshone Tribe. For each of these subsequent benefits analyses, there is a base year (2020) co-pollutant inventory, and a description of both the co-pollutant related benefits and the general community benefits for each quantified GHG reduction measure proposed (Section 4.0).

At the time this inventory was created, there was no Reservation-specific co-pollutant data available for this analysis. The EPA National Emissions Inventory was utilized in order to meet PCAP requirements for this section. In order to provide base year co-pollutant emissions estimates, the Inyo County co-pollutant data from the NEI was scaled down to the population of each Tribe in the OVTC.

Description of Prevalent Co-pollutants

The co-pollutants that are prevalent in the 2020 Inyo County NEI data include volatile organic compounds (VOCs), carbon monoxide (CO), particulate matter (PM10 and PM2.5), methanol, ammonia, nitrogen oxides (NOx), formaldehyde, acetaldehyde, and sulfur dioxide (SO_2) (Table 13; Table 14; Table 15).

Volatile Organic Compounds (VOCs)

VOCs include a variety of compounds frequently found in petroleum fuels, hydraulic fluids, paint thinners, and dry-cleaning agents. Some VOCs have short term health effects such as eye nose and throat irritation as well as long term health effects such as exacerbation of asthma and other respiratory conditions (EPA, 2023).

Carbon Monoxide (CO)

Carbon monoxide is a product of incomplete oxidation of carbon in combustion. Sources of carbon monoxide include gas stoves and furnaces, generators and other gasoline-powered equipment, automotive exhaust, and tobacco smoke (EPA, 2023).

Particulate Matter (PM)

Particulate matter includes both solid particles and liquid droplets that are small enough to be inhaled, which can cause serious adverse health effects. PM2.5 particles are smaller than 2.5 micrometers in diameter, while PM10 particles are smaller than 10 micrometers in diameter (EPA, 2023). PM can penetrate into the lungs and bloodstream, leading to respiratory and cardiovascular problems which may cause premature death. The Owens Lake, located just south of Lone Pine at the terminus of the Owens River, held water for at least 800,000 years before being deprived of water by the City of Los Angeles in 1913. Now known as Owens Dry Lake, it is now known as the largest single source of PM10 dust in the United States (Reheis, 2016).

Methanol

Methanol is used as an industrial solvent for inks, resins, adhesives, and dyes, as well as for chemical manufacturing. Exposure to airborne methanol may occur due to inhalation of evaporative gases from solvent use or vehicle exhaust. Airborne methanol exposure may cause immediate health effects such as visual disturbances and neurological damage, as well as long term health conditions such as cancer and reproductive or developmental effects (EPA, 2000).

Ammonia

Airborne ammonia is a toxicant derived from vehicle exhaust, decomposition of waste, and fertilizer application. The inhalation of ammonia may cause irritation of the eyes, nose, and throat, as well as increase susceptibility to respiratory infections (EPA, 1995).

Nitrogen Oxides (NOx)

Nitrogen oxides (NOx) are a family of poisonous gases emitted via the combustion of fossil fuels. NOx plays a major role in the atmospheric reactions with VOCs that produce ozone, or smog. The inhalation of NO_2 can cause respiratory irritation, as well as contribute to the development of asthma and increase susceptibility to respiratory infections (EPA, 2023).

Formaldehyde

Formaldehyde is a byproduct of combustion and is also found in fuel burning appliances, fertilizers and pesticides, adhesives, composite wood products, building materials such as insulation, and cosmetics. Exposure to formaldehyde typically occurs via inhalation, which may cause irritation of the eyes, nose, and throat, as well as some forms of cancer (EPA, 2023).

Acetaldehyde

Airborne acetaldehyde is a product of wood combustion, vehicle exhaust fumes, waste processing, and other sources. Acute inhalation of acetaldehyde results in depressed respiratory rate and elevated blood pressure, while chronic inhalation resembles the effects of alcoholism in humans. The toxicant is also a probable cause of cancer in humans (EPA, 2000).

Sulfur Dioxide (SO_2)

The largest source of sulfur dioxide is the combustion of fossil fuels, as well as natural sources such as volcanoes. Short term exposure to sulfur dioxide causes respiratory issues in humans, especially those with underlying respiratory conditions such as asthma. It can also harm trees and plants by damaging foliage and decreasing growth, as well as contributing to acid rain (EPA, 2024).

5.1 Bishop Paiute Tribe

The Bishop Paiute Tribe's most significant source of co-pollutant emissions are VOCs, with an estimated release of 1,930.7 tons. This was followed by other criteria air pollutants such as carbon monoxide, PM10, methanol, ammonia, and nitrogen oxides (EPA, 2024).

Co-pollutant Inventory

Table 13 – Bishop Paiute Top 10 Co-Pollutant Emissions Per Year (EPA, 2024)

Pollutant	Pollutant Type	Emissions (tons)
Volatile Organic Compounds	CAP	1,930.7
Carbon Monoxide	CAP	1,138.0
PM10 Primary (Filt + Cond)	CAP	627.9
Methanol	HAP	242.2
Ammonia	CAP	226.4
Nitrogen Oxides	CAP	146.9
PM2.5 Primary (Filt + Cond)	CAP	112.8
Formaldehyde	HAP	59.9
Acetaldehyde	HAP	43.8
Sulfur Dioxide	CAP	25.6

Co-Benefits of Priority Emissions Reduction Measures

1. Tribal Fleet Electrification

Co-pollutant Benefits

This reduction measure targets older and fuel inefficient vehicles for replacement with EVs. The switch to EVs would significantly benefit the Tribe by reducing CAPs emitted into the atmosphere from fossil fuel use. Fossil fuel vehicles produce carbon monoxide and nitrogen oxides as products of the combustion process. They also release fine particles (PM2.5 & 10) through exhaust emissions and from agitating road dust. VOCs are also released into the atmosphere from the evaporation of gasoline and diesel fuel. Since EVs do not run on fossil fuels, they have no direct tailpipe emissions. This measure would greatly reduce the prevalence of these CAPs on the Bishop Reservation.

Additional Benefits

The overall reduction in air pollution from the shift to EV use will help improve air quality on the Reservation, which would benefit the community at large, particularly more vulnerable groups such as children and elderly people. The cost of fuel for the Tribal fleet would also be reduced, as electricity is generally cheaper than gasoline and EV charging would likely be free of charge for Tribal fleet vehicles.

2. Microgrid for Community Buildings Complex

Co-pollutant Benefits

Grid electricity relies on power generation from a variety of different sources, including ones that utilize the combustion of fossil fuel to generate power. The combustion of fossil fuels is known to cause emissions of Volatile Organic Compounds (VOCs), Carbon Monoxide (CO), Particulate Matter (PM10 and PM2.5), Nitrogen Oxides (NOx), and Sulfur Dioxide (SO2). Although these emissions typically are scope 2 emissions occurring upstream of the site where the electricity is used, the electricity used still causes these emissions to occur elsewhere. Solar power does not involve the combustion of fossil fuels, and therefore implementing a solar powered microgrid completely eliminates emissions of the aforementioned pollutants. Also, these microgrids produce and store energy locally, mitigating transmission and distribution losses typically associated with centralized power generation and therefore further reducing co-pollutant emissions.

Additional Benefits

Microgrids enabled with solar and battery storage with peak shaving capabilities can dramatically reduce electricity costs for the Tribal government. By generating and storing energy, the demand for electricity during peak hours when electricity is most expensive will be greatly reduced. Microgrids with battery backup will enhance resilience and safety in the event of power outages and emergencies, allowing at-risk residents to have access to critical services.

3. Microgrid for Paiute Professional Center

Identical benefits as the above measure (Microgrid for Community Buildings Complex).

4. Air-Source Heat Pumps (ASHP) for Residential Sector

Co-pollutant Benefits

Woodstoves and propane heating units are known to produce carbon monoxide, nitrogen oxides, particulate matter, and volatile organic compounds. These compounds can accumulate throughout the home without proper ventilation and cause adverse health effects. Replacing woodstoves and heating units with electricity-powered air-source heat pumps will effectively eliminate the emissions of any criteria air pollutants from propane furnaces. An air source heat pump is much more energy efficient than traditional air conditioning units, therefore, replacing both air conditioning and furnaces with these devices should cut down on scope two emissions of co-pollutants associated with electricity use.

Additional Benefits

Because replacing traditional HVAC systems with ASHPs will eliminate the associated emissions of criteria air pollutants, these retrofits will lead to direct health benefits such as reduced respiratory illness, asthma exacerbations, and cardiovascular problems. ASHPs are more energy efficient than traditional HVAC systems, leading to lower energy costs. Reducing reliance on propane may also increase resilience against volatile fluctuations in fuel prices. The use of electric ASHPs is also more adaptable to renewable energy sources such as solar PV.

5. Community Solar Project

Co-pollutant Benefits

Grid electricity relies on power generation from a variety of different sources, including ones that utilize the combustion of fossil fuel to generate power. The combustion of fossil fuels is known to cause emissions of Volatile Organic Compounds (VOCs), Carbon Monoxide (CO), Particulate Matter (PM10 and PM2.5), Nitrogen Oxides (NOx), and Sulfur Dioxide (SO2). Although these emissions typically are scope 2 emissions occurring upstream of the site where the electricity is used, the electricity used still causes these emissions to occur elsewhere. Solar power does not involve the combustion of fossil fuels, and therefore implementing a solar powered virtual grid completely eliminates emissions of the aforementioned pollutants.

Additional Benefits

Community virtual solar grids enabled with virtual net metering or feed-in tariff capabilities can dramatically reduce electricity costs for the Tribal residents. Because the overhead cost of establishing a solar system on one's property is high, the implementation of this measure addresses environmental justice issues surrounding renewable energy.

5.2 Big Pine Paiute Tribe

The Big Pine Paiute Tribe's most significant source of co-pollutant emissions are VOCs, with an estimated release of 463.4 tons. VOCs are followed by other criteria air pollutants such as carbon monoxide, PM10, methanol, ammonia, and nitrogen oxides (EPA, 2024).

Co-pollutant Inventory

Table 14 – Big Pine Paiute Top 10 Co-Pollutant Emissions Per Year (EPA, 2024)

Pollutant	Pollutant Type	Emissions (tons)
Volatile Organic Compounds	CAP	463.4
Carbon Monoxide	CAP	273.1
PM10 Primary (Filt + Cond)	CAP	150.7
Methanol	HAP	58.1
Ammonia	CAP	54.3
Nitrogen Oxides	CAP	35.3
PM2.5 Primary (Filt + Cond)	CAP	27.1
Formaldehyde	HAP	14.4
Acetaldehyde	HAP	10.5
Sulfur Dioxide	CAP	6.2

Co-Benefits of Priority Emissions Reduction Measures

1. Charging Station Installation

Co-pollutant Benefits

Co-pollutant benefits from the installation of EV charging stations are similar to the benefits acquired from switching to EVs. By providing charging infrastructure and thereby promoting the use of EVs, emissions of carbon monoxide, particulate matter, and nitrogen oxides would be reduced. VOCs have the potential to be reduced even more from this measure, as gasoline and diesel fuel storage contribute to VOC emissions. As EV adoption ramps up and more charging infrastructure is installed, it follows that VOC emissions from gas stations and gas-filling activities would also be reduced.

Additional Benefits

Expanding EV charging infrastructure would lead to reduced air pollution on the Reservation, improving air quality. This would benefit the community at large, particularly more vulnerable groups such as children and elderly people. Tribal members would also save money on fuel because electricity is generally cheaper than gasoline and use of the charging stations could be offered free of charge or at a discounted rate for Tribal members.

2. Energy Audits and Retrofits

Co-pollutant Benefits

This measure aims to retrofit Tribal homes with air-source heat pump technology instead of using wood stoves for heating and triple-paned windows to increase insulation. Wood burning releases a variety of co-pollutants due to the incomplete combustion of organic material including PM2.5, PM10, carbon monoxide, nitrogen oxides, and VOCs. Additionally, HAPs such as benzene, formaldehyde, PAHs, and methane are released from wood burning. Switching to air-source heat pumps would eliminate all CAP and formaldehyde emissions because in contrast to wood burning, heat pumps operate by transferring heat rather than burning organic matter.

Additional Benefits

Air-source heat pumps are an energy efficient alternative to traditional heating that would provide improved indoor air quality and a healthier living environment for Tribal members. This would be particularly beneficial for sensitive groups such as children, elderly people, and those with pre-existing health conditions. Aside from the health benefits, heat pumps have lower operating costs due to low maintenance requirements and a longer lifespan. Although upfront costs are greater, the benefits over time outweigh those from traditional heating.

3. Solarized Tribal Homes

Co-pollutant Benefits

The generation of electricity, particularly from fossil fuels such as coal, natural gas, and oil, releases a variety of co-pollutants. The specific pollutants emitted can vary based on the fuel source. Solarizing tribal homes would reduce the Reservation's reliance on fossil-fuel based electricity generation, leading to a reduction in the emission of co-pollutants such as nitrogen oxides, sulfur dioxide, VOCs. Additionally, it would reduce particulate matter emissions, including both PM2.5 and PM10, which are particularly harmful to respiratory health.

Additional Benefits

Solarizing homes within a community offers a wide range of benefits, from significant reductions in energy costs and enhanced energy independence to promoting environmental sustainability by reducing reliance on fossil fuels. This shift not only contributes to cleaner air by eliminating GHG emissions but also stimulates local economies through job creation in solar installation and maintenance. Additionally, solar energy systems can increase property values, provide stability during power outages, and foster community engagement through education and outreach concerning renewable energy. Together, these advantages underscore the transformative impact of solarization on community resilience, economic health, and environmental stewardship.

4. Solar Parking Canopy

Co-pollutant Benefits

Installing a solar parking canopy offers benefits parallel to those seen with solarizing tribal homes, particularly in reducing dependency on electricity generated from fossil fuels like coal, natural gas, and oil. This shift not only diminishes the Reservation's reliance on non-renewable energy sources but also substantially lowers the emission of co-pollutants, including nitrogen oxides, sulfur dioxide, and volatile organic compounds (VOCs). Furthermore, it contributes to a significant reduction in particulate matter emissions, such as PM2.5 and PM10, which are known to adversely affect respiratory health. By harnessing solar energy through such installations, the community moves towards a cleaner, healthier, and more sustainable energy future.

Additional Benefits

Installing a solar parking canopy offers benefits including the generation of clean, renewable energy that reduces reliance on fossil fuels and cuts GHG emissions. This initiative not only offers significant energy cost savings but also transforms parking areas with shaded spaces, enhancing comfort and reducing the urban heat island effect. Such projects provide educational opportunities about renewable energy, increase resilience with potential backup power during outages, and boost local employment through new jobs in design, installation, and maintenance. Additionally, solar canopies improve the visual appeal of parking areas and foster a sense of community pride in sustainable development.

5.3 Lone Pine Paiute-Shoshone Tribe

The Lone Pine Paiute-Shoshone Tribe's most significant source of co-pollutant emissions are VOCs, with an estimated release of 243.3 tons. This was followed by other criteria air pollutants such as carbon monoxide, PM10, methanol, ammonia, and nitrogen oxides (EPA, 2024).

Co-pollutant Inventory

Table 15 – Lone Pine Paiute Shoshone Top 10 Co-Pollutant Emissions Per Year (EPA, 2024)

Pollutant	Pollutant Type	Emissions (tons)
Volatile Organic Compounds	CAP	243.3
Carbon Monoxide	CAP	143.4
PM10 Primary (Filt + Cond)	CAP	79.1
Methanol	HAP	30.5
Ammonia	CAP	28.5
Nitrogen Oxides	CAP	18.5
PM2.5 Primary (Filt + Cond)	CAP	14.2
Formaldehyde	HAP	7.6
Acetaldehyde	HAP	5.5
Sulfur Dioxide	CAP	3.2

Co-Benefits of Priority Emissions Reduction Measures

1. Charging Station Installation

Co-pollutant Benefits

Co-pollutant benefits from the installation of EV charging stations are similar to the benefits acquired from switching to EVs. By providing charging infrastructure and thereby promoting the use of EVs, emissions of carbon monoxide, particulate matter, and nitrogen oxides would be reduced. VOCs have the potential to be reduced even more from this measure, as gasoline and diesel fuel storage contribute to VOC emissions. As EV adoption ramps up and more charging infrastructure is installed, it follows that VOC emissions from gas stations and gas-filling activities would also be reduced.

Additional Benefits

Expanding EV charging infrastructure would lead to reduced air pollution on the Reservation, improving air quality. This would benefit the community at large, particularly more vulnerable groups such as children and elderly people. Tribal members would also save money on fuel because electricity is generally cheaper than gasoline and use of the charging stations could be offered free of charge or at a discounted rate for Tribal members.

2. Microgrid for Administrative Complex

Co-pollutant Benefits

Grid electricity relies on power generation from a variety of various sources, including ones that utilize the combustion of fossil fuel to generate power. The combustion of fossil fuels is known to cause emissions of Volatile Organic Compounds (VOCs), Carbon Monoxide (CO), Particulate Matter (PM10 and PM2.5), Nitrogen Oxides (NOx), and Sulfur Dioxide (SO_2). Although these emissions typically are scope 2 emissions occurring upstream of the site where the electricity is used, the electricity used still causes these emissions to occur elsewhere. Solar power does not involve the combustion of fossil fuels, and therefore implementing a solar powered microgrid completely eliminates emissions of the aforementioned pollutants. Also, these microgrids produce and store energy locally, mitigating transmission and distribution losses typically associated with centralized power generation and therefore further reducing co-pollutant emissions.

Additional Benefits

Microgrids enabled with solar and battery storage with peak shaving capabilities can dramatically reduce electricity costs for the Tribal government. By generating and storing energy, the demand for electricity during peak hours when electricity is most expensive will be significantly reduced. Microgrids with battery backup will enhance resilience and safety in the event of power outages and emergencies, allowing at-risk residents to have access to critical services.

6.0 REVIEW OF AUTHORITY TO IMPLEMENT

Each Tribe in the OVTC has the authority to implement GHG emissions reduction measures that are located on their respective Reservations and other lands held in federal trust. The governments of sovereign tribal nations maintain the power to determine their own governance structures and enforce their own laws and regulations within their jurisdiction, including the implementation of GHG reduction measures. All the GHG emissions reduction measures identified in Section 4.0 are located on Reservation land. For each Tribe, approval from Tribal Council is required prior to implementing any GHG reduction measure.

If an emissions reduction measure is funded through a CPRG implementation grant, an official resolution would be adopted by the respective Tribal Council to approve acceptance of the grant and authorize the implementation of the project. A cultural monitor will be required for any GHG emissions reduction measures that will result in ground disturbance.

Section 4.0 contains a schedule of milestones for obtaining implementing authority for each priority emissions reduction measure.

7.0 APPENDIX

7.1 GHG Emissions Inventory Methodology

This emissions calculations section outlines the steps taken to calculate each source of GHG emissions on each Reservation. Wherever possible, data sources and estimation tools are cited and described below. Tools that were utilized most frequently include the Tribal Greenhouse Gas Inventory Tool (TGIT) (EPA, 2010), the U.S. Energy Information Administration Commercial Building Energy Consumption Survey (CBECS) (EIA, 2024), and the EPA's Waste Reduction Model (WARM) (EPA, 2024).

7.1.1 Bishop Paiute Tribe

Electricity Consumption Sources

This section of the inventory includes *Scope 2* emissions from electricity consumption, which are emissions derived from electricity that is consumed within the geographical scope of this inventory but generated elsewhere.

The Bishop Reservation is served by the Southern California Edison (SCE) utility provider which is part of the CAMX eGRID subregion. According to the 2022 SCE power content label, energy from this source emits 552 lbs. CO2e per MWh generated (Southern California Edison, 2022).

Commercial Sector Electricity Use

The Bishop Paiute Strategic Energy Plan includes 2015 energy bills for commercial buildings on the Reservation which were used to estimate emissions for this section of the inventory. The facilities listed below are a good representation of facilities present during 2022 (Table 16). The total electricity usage in 2015 was 2,547,839 kWh, resulting in emissions of 638 MTCO2e (Southern California Edison, 2022; Bishop Paiute Tribe , 2018).

Table 16 – Bishop Reservation Commercial Electricity Consumption (2015)

Facility	2015 Electricity Use (kWh)	Emissions (MTCO2e)
Wanaaha Casino	1,775,334	444.5
Utilities/Pumphouses	432,188	108.2
Tribal Offices	61,606	15.4
Community Center	57,098	14.3
Elders Building	59,084	14.8
Cultural Center	41,915	10.5
Tribal Administration	25,251	6.3
Development Corps	31,322	7.8
Gas Station	25,517	6.4
Health Center	5,125	1.3
Community Development	1,452	0.4
Misc. Tribal Buildings	31,947	8.0
Total	2,547,839	638.0

Residential Sector Electricity Use

In the absence of Reservation-specific data for residential electricity usage, the value was estimated using national averages provided by the U.S. EIA. The EIA reported that, in 2020, the average household in the western United States consumed approximately 8,608 kWh of electricity per year (EIA, 2023). While the COVID-19 pandemic may have had a marginal impact on average electricity consumption, there do not appear to be significant differences when comparing data trends from 2010 to 2020. With 650 homes currently residing on the Reservation, this EIA average was used to estimate a total residential electricity usage of 5,595,200 kWh annually (EIA, 2023).

However, a total of 210 homes on the Bishop Reservation currently utilize rooftop solar PV to offset their energy costs. In order to estimate the energy saved by these solar panels, recent aerial imagery was examined to determine that households with solar have solar panels that cover an average of roughly 250 square feet. The National Renewable Energy Lab's (NREL) PVWatts Calculator tool was used to determine that the Bishop area receives an average system output of 6.37 kWh per day per square meter of solar PV cells on rooftops (NREL, 2024). For 210 homes with 200 square feet of solar panels on rooftops, using this system output factor yields a total energy savings of 9 million kWh per year. According to this estimate, it is likely that the homes with solar panels are consistently selling excess electricity back to the LADWP grid. For this reason, electricity consumption from the 210 homes with solar panels will be considered negligible for this emissions inventory, and the above calculation will be repeated for the homes that are currently without solar panels.

There are 440 homes that are currently within the Bishop Reservation that do not have solar panels. The EIA average household electricity consumption factor described above was used to determine the electricity consumption of these 440 homes. It is estimated that these homes consumed 3,787,520 kWh in 2022, resulting in emissions of 948 MTCO2e.

Stationary Point Sources

A point source is a single, identifiable source of pollution, such as a large facility that emits pollution from a single place. Sources that are geographically numerous and difficult to keep track of (i.e., gas-fired water heating tanks) are considered non-point sources. There are no identifiable point sources on the Bishop Reservation, so this section is intentionally left blank.

Stationary Non-Point Sources

Non-point sources are any source of pollution which is outside of the definition of point sources in the above section. A stationary non-point source of greenhouse gases is one that is not mobile, but too many to count individually or keep track of easily. The sources that are estimated and included in this section are propane heaters and water boilers, wood stoves, yard waste burning, and electricity generators.

Residential Sector Wood Burning

Homes on the Reservation are reported to use wood burning stoves for heating as a backup for propane heaters. However, data on specific usage amounts of wood for Bishop Reservation were not available. Consequently, to estimate the amount of wood burned and associated GHG emissions from them, reported estimates from Big Pine Reservation, located just 15 miles south of Bishop, were used. In the 2020 update to the Big Pine emissions inventory, it was reported that each household in Big Pine used an average of 2.5 cords of wood during the winter months (Big Pine Environmental Department, 2020), when heating and wood burning is most required. Because the two Reservations are likely to experience similar environmental conditions and employ similar burning practices, this estimate was used for the 650 households on Bishop Reservation. Approximately 1,625 cords of wood were burned in the winter months of 2022. Assuming a dry weight of 1.25 short tons per cord, 2,031.25 short tons were burned in total, resulting in emissions of 3,376 MTCO2e (EPA, 2023).

Residential Yard Waste Burning

According to the Air Pollution Prevention Plan for the Bishop Paiute Reservation, an estimated total of 44.1 tons of vegetative yard waste is burned by Bishop Reservation residents annually through the legal acquisition of burn permits (Bishop Paiute Tribe EMO, 2020). The EPA Emissions Inventory Improvement Program (EIIP) Volume Three Chapter 16: Open Burning cites that an average of 3,143 pounds of carbon dioxide is emitted per ton of woody debris burned (EPA, 2001). Using this factor, it is estimated that 63 MTCO2e is emitted annually on the Bishop Reservation as a result of vegetative yard waste burning.

Residential Sector Propane Use

Residences on the Bishop Reservation utilize delivered propane gas for heating and cooking. The EPA's household carbon footprint calculator assumes that the average household consumes 39 gallons of propane per month (EPA, 2024). In the absence of specific propane usage data for the 650 homes on the Bishop Paiute Reservation, the annual use of propane was estimated to be 304,200 gallons. This is equivalent to 27,682 MMBtu used, resulting in emissions of 1,747 MTCO2e annually (EPA, 2010). Propane heating is generally used for heating as a backup for woodstove use. This estimate is based on

national averages, and because the percentage of propane used for heating is unknown, this estimate is expected to be in the higher range of actual emissions.

Generator Sources

There are multiple emergency generators located on the Bishop Reservation. There are two large generators located at the Wanaaha Casino, one at each gas station, and one at a water pump house. Unfortunately, due to the short timeline available to collect data for this emissions inventory, it was not possible to obtain fuel use or hours of operation for these generators. It is anticipated that it will be possible to obtain this data for the CCAP emissions inventory due to the longer timeline available for data collection.

Commercial Sector Propane Use

The commercial and institutional facilities on Bishop Reservation use propane for heating and cooking. EIA published data concerning fuel consumption in commercial buildings categorized by building use type and size (EIA, 2024). In the absence of propane usage data, the relevant values for gross energy intensity per square foot were selected for the commercial and institutional facilities and used to estimate their respective annual propane usage in gallons (Table 17). Using an average heat content of 0.091 MMBtu per gallon of propane gas, it was estimated that 239,662 gallons were used, resulting in emissions of 1,377 MTCO2e (Table 17) (EPA, 2010).

Table 17 – Bishop Facilities Propane Use Estimates

Facility	Principle Building Activity	Footprint (Sq ft)	Energy Intensity by Area (Mbtu/sq ft)	Energy Intensity (MMBtu)	Propane Use (gal/yr)	Emissions (MTCO2e)
Wanaaha Casino	Open Continuously	52,000	104.3	5,423.6	59,600.0	342.4
Health Center	Outpatient health care	55,000	92.8	5,104.0	56,087.9	322.2
Yuhubi Nobi Gas Station	Gas station w/ convenience store	7,400	224.7	1,662.8	18,272.3	105.0
Tribal Administration	Office	20,755	65.6	1,361.5	14,961.8	85.9
Barlow Gym	Public Assembly	16,600	81.1	1,346.3	14,794.1	85.0
USFS/BLM Building	Office	17,438	65.6	1,143.9	12,570.7	72.2
Cultural Center	Public Assembly	11,239	81.1	911.5	10,016.3	57.5
Preschool	Education	11,000	62.7	689.7	7,579.1	43.5
Bishop Indian Education Center	Education	9,574	62.7	600.3	6,596.6	37.9
Bishop Paiute Gas Station	Gas station w/ convenience store	2,342	224.7	526.2	5,782.9	33.2
Bishop DMV	Office	7,312	65.6	479.7	5,271.1	30.3
Gaming Commission Office	Office	5,800	65.6	380.5	4,181.1	24.0
EMO Office #2	Office	4,400	65.6	288.6	3,171.9	18.2
Court/Police Building	Office	4,190	65.6	274.9	3,020.5	17.4
OVIWC Office	Office	3,847	65.6	252.4	2,773.2	15.9
Tribal Elders	Office	3,000	65.6	196.8	2,162.6	12.4
Radio Building	Office	3,000	65.6	196.8	2,162.6	12.4
CDD Office	Office	2,700	65.6	177.1	1,946.4	11.2
Maintenance office	Office	2,700	65.6	177.1	1,946.4	11.2
Tribal Council Building	Office	2,700	65.6	177.1	1,946.4	11.2
Social Service Office	Office	2,300	65.6	150.9	1,658.0	9.5
Family Formation Office	Office	2,200	65.6	144.3	1,585.9	9.1
EMO Office #1	Office	2,183	65.6	143.2	1,573.7	9.0
Total				**21,809.2**	**239,661.5**	**1,376.7**

Solid Waste Generation Sources

The emissions associated with solid waste generation on the Bishop Reservation are known as *Scope 3* emissions. *Scope 3* emissions can be described as "downstream" emissions, where the activity from one region subsequently causes emissions in another region. This is the case with Bishop's solid waste generation, as there is no landfill located within the Reservation boundaries; all solid waste is transported to the County of Inyo Sunland landfill.

The Bishop Paiute Tribe EMO Integrated Solid Waste Management Plan includes a 2008 study which measured the quantity of solid waste generated on the Reservation, separated into the following categories: glass bottles, aluminum cans, plastic bottles, recyclable cardboard, mixed paper, yard trimmings, food waste, construction debris and other. The results of the study found that, of the 508 tons per year generated by the residential sector and 25 tons per year generated by the commercial sector, the following percentages can be attributed to these categories: 5% glass bottles, 8% aluminum cans, 8% plastic bottles, 23% recyclable cardboard, 17% mixed paper, 6% yard trimmings, 21% food waste, 0 % metals, 7% construction debris and 5% other (Environmental Management Office Bishop Paiute Tribe, 2009). The total waste from each of these categories was input into the EPA's WARM tool to estimate associated emissions (EPA, 2024).

The population of Bishop Reservation in 2022 was 2,000, however, it was 1,350 at the time of this study. Using a scaling factor calculated from this population change, the generated solid waste measured by this study in 2008 was scaled to represent the solid waste generated annually in the year 2022.

Commercial Sector Solid Waste Generation

Using the calculation methodology outlined in the above section, commercial sector solid waste generation was estimated to have resulted in emissions of 4.3 MTCO2e in 2022. This represented 3.4% of the Reservation's total solid waste generation.

Residential Sector Solid Waste Generation

Using the calculation methodology outlined in the above section, commercial sector solid waste generation was estimated to have resulted in emissions of 123.0 MTCO2e in 2022. This represented 96.6% of the Reservation's total solid waste generation.

On-road Mobile Sources

On-road mobile emissions include any sources that are within the transportation sector that originate from paved roadways. At the time this inventory was created, there was no data on Tribal fleet vehicle fuel use of vehicle miles traveled (VMT). Consequently, this section of the inventory will be based on the residential sector on-road emissions estimate only.

Residential Sector On-road Mobile

At the time this inventory was created, there was no new vehicle miles travelled (VMT) data available for 2022. To calculate an estimate of residential on-road mobile sources, calculation methods from the 2019 Air Quality on the Bishop Paiute Reservation Source and Emissions Inventory Report were used. The report measured the distances of paved and unpaved roads on the Bishop Reservation and assumed

that 2 out of 3 members of each household each made 2 trips to and from their home (Bishop Paiute Tribe, 2019). This equates to 4 trips per household per day, totaling 108,091 miles in one year. Using the average of 24.1 miles per gallon for passenger cars provided by the TGIT, travelling this distance would consume an estimated 4,485 gallons of gasoline, amounting to emissions of 39.4 MTCO2e (EPA, 2010).

Non-road Mobile Sources

Non-road mobile sources of emissions include any source that is not stationary and does not travel on paved roadways. These emissions are also frequently known as "off-road mobile" sources. The sources on the Bishop Reservation that fit in this category include lawn and garden equipment.

Lawn and Garden Equipment

The Bishop Tribal Government owns and regularly operates 10 lawn mowers, 10 weed whackers, and 2 chippers. Unfortunately, with the short timeline available to gather data for the PCAP emissions inventory, it was not possible to obtain specific data on lawn and garden equipment fuel use or hours of operation. With the longer timeline anticipated to complete the CCAP emissions inventory, it may be possible to obtain more specific data that would allow for enhanced precision in measuring associated GHG emissions.

Water

Bishop Paiute Reservation does not import any water. All residential and commercial water use is sourced from local groundwater wells. The electricity use associated with groundwater pumping is included in the commercial electricity consumption section of this report.

Wastewater

All of the 2,000 residents in the Bishop Paiute Reservation are served by the Eastern Sierra Community Service District wastewater treatment plant (WWTP). The WWTP plant is located outside of the Reservation boundary and consists of aerated lagoons and an anaerobic digester. It is assumed that none of the residents use septic tanks anymore. Using the framework that the TGIT employs to calculate scope 3 methane and nitrous oxide emissions from the wastewater treatment process, it is estimated that 778.4 MTCO2E are produced annually (EPA, 2010).

Carbon Sinks

Urban Forestry

The urban forestry section of this report details the carbon absorbed from the atmosphere by organic material. This estimate of carbon sequestration follows the estimation framework of the TGIT, which is based on the percent of urban canopy present at the Bishop Reservation. According to the Bishop Paiute Reservation Forest Management Plan, there are an estimated 94 acres of Desert Cottonwood/Willow Riparian Forest on the Reservation (Sikora, 2014). Additionally, there are 163 acres of abandoned pastureland, where invasive tree species half become well established (Sikora, 2014). It is assumed that 5% of this pastureland contains a tree canopy. In total, there are an estimated 102 acres of tree canopy out of the total 877 acres that make up the Bishop Reservation. This urban forest cover will sequester an estimated (-)336.7 MTCO2e per year.

7.1.2 Big Pine Paiute Tribe

Electricity Consumption Sources

The Big Pine Reservation is served by the Los Angeles Department of Water and Power (LADWP) utility provider which is part of the CAMX eGRID subregion. According to the 2022 LADWP power content label, energy from this source emits 567 pounds CO2e per MWh generated (LADWP, 2024).

Residential Electricity Use

The residential sector on the Big Pine Reservation consists of 184 homes, accommodating 480 residents. For the period from August 2017 to August 2018, the cumulative electricity usage for all residential properties supplied by the LADWP was recorded as 951,209 kWh. *Scope 2* emissions, associated with the generation of this electricity, were calculated to be 244.6 MTCO2e for the residential sector (EPA, 2010; LADWP, 2024).

Commercial Sector Electricity Use

The commercial sector on Big Pine Reservation consists of Tribal buildings, community buildings, gyms, a pumphouse, and a utility office. For the period from August 2017 to August 2018, the cumulative electricity usage for all commercial facilities supplied by the LADWP was recorded as 238,774 kWh. *Scope 2* emissions, associated with the generation of this electricity, were calculated to be 61.4 MTCO2e for the commercial sector (EPA, 2010; LADWP, 2024).

Stationary Point-Sources

No point sources have been identified on Big Pine Reservation at this time.

Stationary Non-Point Sources

Residential Yard Waste Burning

Big Pine residents who have obtained burning permits are authorized to burn yard waste, provided they adhere to the specific requirements and guidelines issued by the Reservation. If all 184 residences burn yard waste, each with an average of 3 residents and 0.57 pounds of yard waste burned per person per day, a total of 115,468 pounds, or 58 short tons, of yard waste are estimated to be burned per year. According to the EPA's Emissions Factors for Greenhouse Gas Inventories, yard trimmings release 0.05 MTCO2e per short ton of material that is combusted (EPA, 2023). Based on this factor, it is estimated that the annual emissions from combusted yard waste amount to 2.9 MTCO2e on Big Pine Reservation.

Residential Sector Wood Burning

Most homes on the Reservation are reported to use wood burning stoves for heating. In the 2020 update to the Big Pine emissions inventory, it was reported that each household used an average of 2.5 cords of wood during the winter months (Big Pine Environmental Department, 2020), when heating and wood burning is most required. Assuming that all 184 residences currently use wood for heating, approximately 460 cords of wood were burned in the winter months. Assuming a dry weight of 1.25 short tons per cord, 575 short tons were burned in total, resulting in emissions of 943.1 MTCO2e (EPA, 2023).

Residential Sector Propane Use

Homes on the Reservation are reported to use propane as backups to the wood burning stoves for heating and cooking. The EPA's household carbon footprint calculator assumes that the average household consumes 39 gallons of propane per month (EPA, 2024). In the absence of specific propane usage data for the 184 homes and 480 residents on Big Pine Reservation, the annual use of propane was estimated to be 86,112 gallons, resulting in emissions of 495.0 MTCO2e annually (EPA, 2010).

Commercial Sector Propane Use

Several institutional and recreational facilities make up the commercial sector of the Big Pine Reservation. These facilities use propane for heating. EIA published data concerning fuel consumption in commercial buildings categorized by building use type and size (EIA, 2024). In the absence of propane usage data, the relevant values for gross energy intensity per square foot were selected for the facilities by principal building activity and used to estimate their respective annual propane usage in gallons (Table 18). Using an average heat content of 0.091 MMBtu per gallon of propane gas, it was estimated that 36,466 gallons were used to produce 3,335 MMBtu of energy, resulting in emissions of 209.7 MTCO2e (Table 18) (EPA, 2010).

Table 18 – Big Pine Commercial Sector Propane Usage and Associated Emissions

Facility	Principal Building Activity	Area (sq ft)	Energy Intensity by Area (Mbtu/sq ft)	Energy Intensity (MMBtu)	Propane Usage (gal/yr)	MTCO2e
Administrative Offices	Office	10320	65.6	677	7,403	42.6
Recreation Centers	Public Assembly	29697	89.5	2,658	29,063	167.2
Total				3,335	36,466	209.7

Solid Waste Generation Sources

There is no landfill located within the Reservation boundaries, and waste is first self-hauled to a transfer station by residents, then hauled to Bishop-Sunland landfill by Bishop Waste Disposal. Big Pine Reservation's contribution to methane emissions (in carbon dioxide equivalent) associated with decomposing waste material is estimated in this section.

In the absence of solid waste hauling data, GHG emissions from residential and commercial landfill waste were estimated using CalRecycle's daily waste generation averages for major waste sources (CalRecycle, 2024) and the Waste Reduction Model (WARM) Tool provided by the EPA (EPA, 2024). In the residential sector, consisting of 184 households, each household generates an average of 12.23 pounds of waste per day. This leads to an estimated total of 411 short tons of solid waste, contributing to 127.0 MTCO2e, annually (EPA, 2024; CalRecycle, 2024). In the commercial sector, the total indoor area across all commercial and institutional facilities amounted to 40,017 square feet. With an average waste generation rate of 13 pounds per 1,000 square feet per day, the commercial sector generates 95 short tons of waste annually, contributing to 29.4 MTCO2e (CalRecycle, 2024; EPA, 2024). In total, 506

short tons of waste were generated on the Reservation, resulting in 156.4 MTCO2e of *Scope 3* emissions (Table 19).

Table 19 – Big Pine Solid Waste Generation Estimates and Associated Emissions

Sector	Units	Waste Generation Rate	Waste Generated (short tons)	MTCO2e
Residential	184 households	12.23 lbs/household/day	411	127.0
Commercial	40,017 sq ft	13 lbs/1,000 sq ft/day	95	29.4
Total			506	156.4

On-Road Mobile Sources

Residential On-Road Mobile Sources

At the time this inventory was constructed, there was no data available on vehicles or vehicle miles travelled by residents. To address these data gaps, estimates from the National Emissions Inventory for Inyo County for passenger light-duty vehicles (EPA, 2024) were scaled to calculate per capita emissions and then to obtain emissions estimates for the population of Big Pine Reservation (480 residents). Inyo County has a population of 18,718 residents and produced 174,693 MT CO2e in 2022 from passenger vehicles. The approximate GHG emissions from residential mobile sources for Big Pine Reservation was determined to be 4,479.8 MTCO2e.

Tribal Fleet On-Road Mobile

The 2020 update of the Big Pine emissions inventory indicated that the Tribal fleet consisted of 9 vehicles. The breakdown by vehicle type revealed that light-duty passenger vehicles accumulated 14,245 vehicle miles traveled (VMT), while light-duty trucks accounted for 11,064 VMT from January 10, 2019, to January 10, 2020, (Big Pine Environmental Department, 2020). Annual emissions from the Tribal fleet were estimated using for each vehicle type by VMT, estimated average fuel efficiency, and fuel type from the TGIT (EPA, 2010). In 2019, the Tribal fleet's light-duty passenger vehicles consumed 591 gallons of gasoline, resulting in emissions of 5.2 MTCO2e. Meanwhile, the light-duty trucks consumed a total of 598 gallons of gasoline, resulting in emissions of 5.3 MTCO2e. In sum, the on-road mobile sources within the Tribal fleet collectively contributed 10.4 MTCO2e (EPA, 2010).

Non-Road Mobile Sources

Lawn and Garden Equipment

The Tribe owns various lawn and garden equipment, including 24 lawnmowers and 10 leaf blowers. It is estimated that each piece of equipment consumes around 20 gallons of gasoline annually. The TGIT calculates that the annual consumption of 680 gallons of gasoline for this equipment results in emissions of 6.0 MTCO2e (EPA, 2010). The Big Pine Paiute Tribe also owns two backhoes and a woodchipper which are used regularly. At the time this inventory was created, it was not possible to obtain an estimate on fuel use for this equipment.

Agriculture and Land Management

Agricultural and land management sources of GHG emissions have not been identified at this time on the Big Pine Reservation.

Water

The Big Pine Reservation relies exclusively on local sources for its water supply, with no imports for residential or commercial purposes. Water is drawn directly from these sources using pumps, one of which is powered by electricity generated from on-site solar panels. At present, however, there is insufficient data to accurately estimate *Scope 3* emissions associated with water usage, including the electricity consumed for pumping and other emissions related to distributing water within the Reservation.

Wastewater

The Big Pine Reservation utilizes a pipeline system that transports wastewater to the east, through a pipeline underneath the Big Pine Canal, discharging into lagoon system with two large ponds designed for wastewater treatment. This system serves the 480 residents and processes between 27,000 and 38,000 gallons daily on average. No residential or commercial facilities on the Reservation rely on septic systems for wastewater management. The lagoon relies on natural aeration, primarily from wind action across the water's surface, without mechanical assistance. The system also includes a diesel-powered backup generator for pumping. According to the TGIT, the wastewater system, which operates under aerobic conditions without a nitrification/denitrification process, emits 10.3 MTCO2e in nitrous oxide annually (EPA, 2010).

7.1.3 Lone Pine Paiute-Shoshone Tribe

Electricity Consumption Sources

The Lone Pine Reservation is served by the Los Angeles Department of Water and Power (LADWP) utility provider which is part of the CAMX eGRID subregion. According to the 2022 LADWP power content label, energy from this source emits 567 lbs. CO2e per MWh generated (LADWP, 2024).

Residential Sector Electricity Use

In the absence of Reservation-specific data for residential electricity usage, the value was estimated using national averages provided by the U.S. EIA. The EIA reported that, in 2020, the average household in the western United States consumed approximately 8,608 kWh of electricity per year (EIA, 2023). While the COVID-19 pandemic may have had a marginal impact on average electricity consumption, there do not appear to be significant differences when comparing data trends from 2010 to 2020. With 112 homes currently residing on the Reservation, this EIA average was used to estimate a total residential electricity usage of 964,096 kWh annually, resulting in emissions of 248.0 MTCO2e (EPA, 2010; LADWP, 2024)

Commercial Sector Electricity Use

In the absence of Reservation-specific data for commercial electricity usage, estimates were calculated using national averages provided by the U.S. Energy Information Administration (EIA) 2018 Commercial Building Energy Consumption Survey (CBECS) which provides average electricity usage in kWh per square foot for buildings of different sizes, activities, occupancy, and climate zones. Commercial buildings within the Lone Pine Reservation were classified based on their activity and size to estimate the electricity consumption of each building (Table 20). In total, the commercial sector was estimated to use 573,439 kWh of electricity annually, resulting in emissions of 147.5 MTCO2e (LADWP, 2024) (EPA, 2010).

Table 20 – Lone Pine Commercial Sector Facility Electricity Use Emissions Estimate

Facility	Principal Building Activity	Area (sq ft)	Energy Use by area (kWh/sq ft)	Electricity use (kWh)	MTCO2e
Computer Lab	Office	5,250	11.4	59,850	15.4
Elders Building	Office	2,080	11.4	23,712	6.1
Environmental Office	Office	1,204	11.4	13,726	3.5
Gym	Public Assembly	8,550	10.4	88,920	22.9
Main Street Shop	Warehouse/storage	1,800	5.6	10,080	2.6
OVIHA Garage Shop 1	Warehouse/storage	1,800	5.6	10,080	2.6
OVIHA Garage Shop 2	Warehouse/storage	6,000	5.6	33,600	8.6
OVIHA Housing	Office	2,040	11.4	23,256	6.0
Pumphouse	Other	529	9.5	5,026	1.3
Toiyabe Clinic	Outpatient Health Care	8,500	14.9	126,650	32.6
Toiyabe Office Modular	Office	2,100	11.4	23,940	6.2
Tribal Historic Preservation Office	Office	900	11.4	10,260	2.6
Tribal Meeting Modular	Office	2,100	11.4	23,940	6.2
Tribal Office	Office	6,000	11.4	68,400	17.6
Wellness Center	Public Assembly	5,000	10.4	52,000	13.4
Total				573,439	147.5

Stationary Point Sources

No point sources have been identified on Lone Pine Reservation at this time.

Stationary Non-Point Sources

Residential Sector Wood Burning

Most homes on the Reservation are reported to use wood burning stoves for heating. However, data on specific usage amounts of wood for Lone Pine Reservation were not available. Consequently, to estimate the amount of wood burned and associated GHG emissions from them, reported estimates from Big Pine Reservation, located just 40 miles north of Lone Pine, were used. In the 2020 update to their emissions inventory, it was reported that each household in Big Pine used an average of 2.5 cords of wood during the winter months (Big Pine Environmental Department, 2020), when heating and wood burning is most required. Because the two Reservations are likely to experience similar environmental conditions and employ similar burning practices, this estimate was used for the 112 households on Lone Pine Reservation. Approximately 280 cords of wood were burned in the winter months. Assuming a dry weight of 1.25 short tons per cord, 350 short tons were burned in total, resulting in emissions of 574.1 MTCO2e (EPA, 2023).

Residential Sector Propane Use

Homes on the Reservation are reported to use propane cooking, as well as backups to wood burning stoves for heating. The EPA's household carbon footprint calculator assumes that the average household consumes 39 gallons of propane per month (EPA, 2024). In the absence of specific propane usage data for the 112 homes and 252 residents on Lone Pine Reservation, the annual use of propane was estimated to be 52,416 gallons, for a total energy use of 4,794 MMBtu, and resulting in emissions of 301.5 MTCO2e annually (EPA, 2010).

Commercial Sector Propane Use

The commercial and institutional facilities on Lone Pine Reservation use propane for heating. EIA published data concerning fuel consumption in commercial buildings categorized by building use type and size (EIA, 2024). In the absence of propane usage data, the relevant values for gross energy intensity per square foot were selected for the commercial and institutional facilities and used to estimate their respective annual propane usage in gallons (Table 21). Using an average heat content of 0.091 MMBtu per gallon of propane gas, it was estimated that 40,051 gallons were used, resulting in emissions of 230 MTCO2e (Table 21) (EPA, 2010).

Table 21 – Lone Pine Commercial Sector Propane Usage and Associated Emissions

Facility	Principal Building Activity	Area (sq ft)	Energy Intensity by area (Mbtu/sq ft)	Energy Intensity (MMBtu)	Propane Usage (gal/yr)	MTCO2e
Computer Lab	Office	5250	65.6	344	3,766	21.7
Elders Building	Office	2080	65.6	136	1,492	8.6
Gym	Public Assembly	8550	89.5	765	8,367	48.1
Main Street Shop	Warehouse/storage	1800	30.2	54	594	3.4
OVIHA Garage Shop 1	Warehouse/storage	1800	30.2	54	594	3.4
OVIHA Garage Shop 2	Warehouse/storage	6000	30.2	181	1,981	11.4
OVIHA Housing	Office	2040	63.2	129	1,410	8.1
Pumphouse	Other	529	114.3	60	661	3.8
Toiyabe Clinic	Outpatient Health Care	8500	92.8	789	8,625	49.6
Toiyabe Office Modular	Office	2100	63	132	1,447	8.3
Tribal Historic Preservation Office	Office	900	63.2	57	622	3.6
Tribal Meeting Modular	Office	2100	63.2	133	1,451	8.3
Tribal Office	Office	6000	63.2	379	4,146	23.8
Wellness Center	Public Assembly	5000	89.5	448	4,893	28.1
Total				3,774	40,051	230.4

Solid Waste Generation Sources

There is no landfill located within the Reservation boundaries, and waste is hauled to Inyo County Dump by Waste Connection Companies and individual residents. Lone Pine Reservation's contribution to methane emissions associated with decomposing waste material is estimated in this section.

In the absence of solid waste hauling data, GHG emissions from residential and commercial landfill waste were estimated using CalRecycle's daily waste generation averages for major waste sources (CalRecycle, 2024) and the Waste Reduction Model (WARM) Tool provided by the EPA (EPA, 2024). In the residential sector, consisting of 112 households, each household generates an average of 12.23 pounds of waste per day. This leads to an estimated total of 250 short tons of solid waste, contributing to 77.3 MTCO2e, annually (EPA, 2024; CalRecycle, 2024). In the commercial sector, the total indoor area across all commercial and institutional facilities amounted to 53,853 square feet. With an average waste generation rate of 13 pounds per 1,000 square feet per day, the commercial sector generates 128 short tons of waste annually, contributing to 39.5 MTCO2e (CalRecycle, 2024; EPA, 2024). In total, 378 short

tons of waste were generated on the Reservation, resulting in 116.8 MTCO2e of *Scope 3* emissions (Table 22 – Lone Pine Solid Waste Generation Estimates and Associated Emissions).

Table 22 – Lone Pine Solid Waste Generation Estimates and Associated Emissions

Sector	Units	Waste Generation Rate	Waste Generated (short tons)	MTCO2e
Residential	112 households	12.23 lbs/household/day	250	77.3
Commercial	53,853 sq ft	13 lbs/1000 sq ft/day	128	39.5
Total			378	116.8

On-Road Mobile Sources

Residential On-Road Mobile Sources

At the time this inventory was constructed, there was no data available on vehicles or vehicle miles travelled by residents. To address these data gaps, estimates from the National Emissions Inventory for Inyo County for passenger light-duty vehicles (EPA, 2024) were scaled to calculate per capita emissions and then to obtain emissions estimates for the population of Lone Pine Reservation (252 residents). Inyo County has a population of 18,718 residents and produced 174,693 MT CO2e in 2022 from passenger vehicles. The approximate GHG emissions from residential mobile sources for Lone Pine Reservation was determined to be 2,351.9 MTCO2e. Highway 395, which bisects the Reservation, is assumed to be mostly travelled by non-tribal residents, so it is not included in this analysis to avoid skewing this calculation.

Tribal Fleet On-Road Mobile Sources

A comprehensive inventory of the Tribal fleet, which consists of 10 vehicles, was conducted by the Lone Pine Environmental Department, which captured vehicle make, model, fuel type, and vehicle miles traveled (VMT) in 2022. Annual emissions from the Tribal fleet were estimated using the total VMT obtained from this inventory and the estimated average fuel efficiency by vehicle type and fuel type from the TGIT (EPA, 2010). In 2022, the Tribal fleet's gasoline-powered vehicles traveled a combined distance of 24,000 miles, consuming 1,059 gallons of gasoline, and resulting in emissions of 9.2 MTCO2e. Meanwhile, the diesel-powered Tribal fleet vehicles covered a total distance of 70,300 miles, consuming 6,940 gallons of diesel, and contributing to emissions of 70.9 MTCO2e. In sum, the on-road mobile sources within the Tribal fleet collectively contributed 80.2 MTCO2e (EPA, 2010).

Non-Road Mobile Sources

Construction Equipment

The Tribe owns various construction equipment, such as a small John Deere Tractor, a Bobcat, backhoes, a small Cat Excavator, and a trench digger. However, there is currently no usage data available for this equipment. Consequently, there is insufficient data currently to compile an inventory of GHG emissions resulting from the use of construction equipment on the Reservation.

Lawn and Garden Equipment

The Tribe owns various lawn and garden equipment, such as chainsaws, pole saws, mowers, weed whackers, and rototillers. However, there is currently no usage data available for this equipment. Consequently, there is insufficient data currently to compile an inventory of GHG emissions resulting from the use of lawn and garden equipment on the Reservation.

Agriculture and Land Management

Agricultural and land management sources of GHG emissions have not been identified at this time on the Lone Pine Reservation.

Water

No water is imported to Lone Pine Reservation. Furthermore, there are no *Scope 3* emissions identified in relation to water usage that can be inventoried at this time, including from electricity use for pumping or other emissions involved in supplying water to the Reservation.

Wastewater

All facilities and residences on Lone Pine Reservation are serviced by the Lone Pine Community Services District. Wastewater is treated aerobically. For a population of 252 residents, it is estimated that 5.4 MTCO2e is emitted annually by wastewater treatment (EPA, 2010).

7.2 Priority Reduction Measures Methodology

7.2.1 Bishop Paiute Tribe

Tribal Fleet Electrification

The Tribal fleet is comprised of 80 vehicles which each travel an average of 13,476 miles per year. The Tribe would like to replace 20 of these vehicles with EVs. This will reduce gasoline powered vehicle transportation by a total of 269,520 miles per year. Using an average of 24.1 miles per gallon for passenger cars (EPA, 2010), this will equate to eliminating the combustion of 11,183.4 gallons of gasoline through the implementation of this measure. This will lead to a reduction of 98.6 MTCO2e in emissions per year (EPA, 2010). This estimate does not consider the upstream emissions associated with the production of EVs and their batteries.

Microgrid for Community Buildings Complex

The emissions inventory indicates that the buildings within the complex have an annual electricity consumption of approximately 91,031 kWh. The emissions inventory reported that this *Scope 2* source resulted in 22.8 MTCO2e. Two parking lots in the complex provide an ample area of 72,490 sq ft available for solar panel installation. Based on a plane of array irradiance of 215 kWh per square foot per year (NREL, 2024) and a solar conversion efficiency of 20% (Enel X, 2024), installing a solar parking canopy covering the entire parking lot would produce enough electricity to fulfill and exceed the energy requirements of the entire building complex. SCE is the electricity provider for the community buildings complex within the Reservation, which emits 552 pounds of CO2e per MWh generated (Southern California Edison, 2022). With an estimated 3,121,797 kWh generated by these solar panels annually, emissions are estimated to be reduced by 782 MTCO2e per year.

Microgrids for Professional Center

The emissions inventory indicates that the buildings within the professional center have an annual electricity consumption of approximately 218,644 kWh. The emissions inventory reported that this *Scope 2* source resulted in 54.7 MTCO2e. The parking lot of the complex provides an ample area of 105,360 sq ft available for solar panel installation. Based on a plane of array irradiance of 215 kWh per square foot per year (NREL, 2024) and a solar conversion efficiency of 20% (Enel X, 2024), installing a solar parking canopy covering the entire parking lot would produce enough electricity to fulfill and exceed the energy requirements of the entire professional center. SCE is the electricity provider for the community buildings complex within the Reservation, which emits 552 pounds of CO2e per MWh generated (Southern California Edison, 2022). With an estimated 3,629,880 kWh generated by these solar panels annually, emissions reductions are estimated to be 909 MTCO2e per year.

Air-Source Heat Pumps for Residential Sector

The residents of the Bishop Reservation primarily use woodstoves for heating their homes, and air conditioning to cool them. The Tribe aims to enhance energy efficiency of the residential sector through the installation of air source heat pumps for 650 homes on the Reservation. Air source heat pumps

provide both heating and cooling for households and are much more energy efficient than traditional air conditioning units.

The emissions inventory estimated that the residential sector produces about 3,376 MTCO2e annually using woodstoves for heating (Section 3.1). The residential sector is also estimated to produce 948 MTCO2e annually from electricity use alone (Table 1). On average, 14.5% of electricity consumption is related to home cooling or air conditioning (EPA, 2024), so it is assumed that 137 MTCO2e is the result of home cooling. This means that, in total, home heating and cooling on the Bishop Reservation leads to emissions of 3,513 MTCO2e per year before the implementation of this GHG reduction measure.

Based on analysis of a Department of Energy (DOE) database, the average energy consumption of an air-source heat pump is 5,475 kWh annually per home (McCabe, 2023). If 650 homes are retrofitted with this technology, this will lead to an estimated annual electricity consumption of 3,558,750 kWh, resulting in emissions of 891 MTCO2e (Southern California Edison, 2022). Compared with the baseline scenario described above with emissions totaling 3,513 MTCO2e for heating and cooling, the implementation of this GHG reduction measure would reduce greenhouse gas emissions by 2,622 MTCO2e.

Community Solar Project

The Tribe is proposing to dedicate a developed area such as the Bishop Paiute Tribe Commercial Park to install enough solar panels to offset the emissions of at least 540 residential homes on the Reservation. Surplus energy generated by this solar project can be used to offset energy bills in commercial buildings as well. The current estimated electricity use of 540 homes on the Reservation is 4,648,320 kWh per year, resulting in annual *Scope 2* emissions of 1,164 MTCO2e (Southern California Edison, 2022). This is equivalent to the total emissions that would be saved by the implementation of this measure.

7.2.2 Big Pine Paiute Tribe

Charging Station Installation

Emissions reductions achieved by installing EV charging stations were quantified by utilizing miles charged per year. The Tribe is planning to install three Level 2 EV chargers near the administrative buildings. Assuming each charger is used 12 hours per day, this will reduce gasoline powered vehicle transportation by a total of 197,100 miles per year. Using the current average fuel efficiency of 24.1 miles per gallon for passenger gasoline-powered vehicles (EPA, 2010) and the GHG emissions related to gasoline combustion, the Reservation could see an annual reduction in emissions of 69.7 MTCO2e.

Energy Audits and Retrofits

The Tribe aims to equip all 184 Tribal homes with air-source heat pumps and triple-pane windows. The emissions inventory estimated that the residential sector produces up to 943 MTCO2e annually using wood burning stoves for heating. The retrofitting of 184 homes with heat pump technology would increase efficiency by 65% (EIA, 2023) and high efficiency insulating windows would increase efficiency by 40% (U.S. Department of Energy, 2024). Under the assumption that, nationally, 52% of electricity use on average is devoted to heating and cooling in homes (EIA, 2023), these retrofits would result in a

reduction of approximately 95 MTCO2e, relative to the national average. It would also eliminate emissions related to the use of wood stoves for residential heating. Accounting for both factors, the installation of air-source heat pumps and insular windows could reduce GHG emissions by a total of up to 1,038 MTCO2e.

Solarized Tribal Homes

LADWP supplies electricity to the residential areas of the Reservation, with an annual consumption estimated at 951,209 kWh according to the emissions inventory. This reduction measure aims to shift the residential sector towards the use of renewable energy by installing solar panels on as many as 184 homes within the Reservation. Based on a plane of array irradiance of 215 kWh per square foot per year (NREL, 2024) and a solar conversion efficiency of 20% (Enel X, 2024), it is estimated that seven (7) solar panels, each covering 17.5 sq ft, installed on each home would suffice to meet the residential sector's energy needs. The solarization of Tribal homes would reduce emissions by up to 245 MTCO2e annually.

Solar Parking Canopy

LADWP supplies electricity to the community and institutional buildings that make up the commercial sector of the Reservation with 238,774 kWh of electricity annually. The emissions inventory reported that this *Scope 2* source resulted in 61.4 MTCO2e. This reduction measure aims to shift the commercial sector towards the use of renewable energy by installing solar panels on the administrative building parking lot. Based on a plane of array irradiance of 215 kWh per square foot per year (NREL, 2024) and a solar conversion efficiency of 20% (Enel X, 2024), a total panel area of 5,544 sq ft would suffice to meet the sector's energy needs. However, the total area of the parking lot offers an ample area of 11,500 sq ft available for solar panel installation. Under optimal conditions a solar parking canopy at this location would generate enough electricity to exceed the commercial sector's requirements, producing 495,250 kWh per year. In total, the deployment of a microgrid could reduce GHG emissions by 127.4 MTCO2e annually and provide a more resilient energy source that is independent of LADWP.

7.2.3 Lone Pine Paiute-Shoshone Tribe

Charging Station Installation

Emissions reductions achieved by installing EV charging stations were quantified by utilizing miles charged per year. The Tribe is planning to install five Level 2 EV chargers near the administrative buildings. Assuming each charger is used 12 hours per day, this will reduce gasoline powered vehicle transportation by a total of 328,500 miles per year. Using the current average fuel efficiency of 24.1 miles per gallon for passenger gasoline-powered vehicles (EPA, 2010) and the GHG emissions related to gasoline combustion, the Reservation could see an annual reduction in emissions of 116.2 MTCO2e.

Microgrid for Administrative Complex

The emissions inventory indicates that the buildings within the administrative complex have an annual electricity consumption of approximately 407,836 kWh. The emissions inventory reported that this *Scope 2* source resulted in 105 MTCO2e. The Tribal headquarters parking lot provides an ample area of 11,288 sq ft available for solar panel installation. Based on a plane of array irradiance of 215 kWh per

square foot per year (NREL, 2024) and a solar conversion efficiency of 20% (Enel X, 2024), installing a solar parking canopy covering the entire parking lot would produce enough electricity to fulfill and exceed the energy requirements of the entire administrative complex. LADWP is the electricity provider for the administrative complex within the Reservation, which emits 567 pounds of CO2e per MWh generated (LADWP, 2024). With an estimated 486,120 kWh generated by these solar panels annually, emissions reductions are estimated to be 125 MTCO2e per year. Furthermore, given these assumptions, solar panels covering only 9,470 sq ft of the parking lot would offset all emissions from the administrative complex.

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