SAN CARLOS APACHE TRIBE
PRIORITY CLIMATE ACTION PLAN

SUBMITTED TO:

United States Environmental Protection Agency

Office of Air and Radiation

For the

EPA -Climate Pollution Reduction Grants Program

01 April 2024

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1. Introduction

1.1 About the San Carlos Apache Tribe

The San Carlos Apache Tribe (Tribe) is a federally recognized Tribe located in Southeastern Arizona with approximately 10,315 Tribal members located on the San Carlos Apache Reservation which consists of 1,834,781 acres spanning three counties; Gila, Graham, and Pinal. According to the "Demographic Analysis of the San Carlos Tribe" compiled by the Arizona Rural Institute based on the 2010 Census and the 2010 American Community Survey (5-year estimates) the Reservation population was 10,068, with approximately 2,320 households with 25.4% of those households multi-generational with a median household income of $26,925, 71% of the median for the county, and 52% of the state median income level.[1] The 2020 census indicates a total population of the Reservation of 10,204, and an estimated 2,519 occupied housing units.

We are a strong resilient people, who are experienced in adaptation. Throughout the years following western integration into tribal communities, we have encountered vast change. Much of the change came from the forced integration into non-traditional societies, loss of traditional lands, and continual removal from our homelands. This continual abrasion to our traditional ways of life forced our people to utilize traditional knowledge and create ways, methods, techniques, and processes to find ways to sustain and continue as a people.

We have been connected to these lands since time immemorial yet the unending encroachment on our lands by the settlers and the federal government forced us into larger communities and pushed us into a lifestyle that was totally foreign to us, yet we adapted, learned the ways of the oppressors, and are continually working to build a better way of life for our people.

We continue to battle the impacts from the U.S. government's intrusion, most specifically, from the construction of the Coolidge Dam and local mining ventures. Early on this Dam was a big problem as it ended up flooding some of the most valuable arable tribal lands and farms that we relied on. As compensation for the flooding, the government promised the Tribe we would receive electricity at a rate of

[1] Demographic Analysis of the San Carlos Apache Tribe using2010 Census and 2010 American Community Survey Estimates. Northern Arizona University Arizona Rural Policy Institute.

$0.002/kWh,[23], yet we have never received this compensation. Instead, we have been subjected to electric rates much higher than average for the State of Arizona.

As we continue to identify ways to adapt and work within the confines of western rule, we also continue to adapt to this new way of life and make efforts to take control of our destiny. We are working on developing ways to not just exist, but to thrive. We continue to enjoy and fight to protect the amazing beauty of our many mountains, forests, meadows, and deserts as well as protect the lands we share with elk, deer, bear, mountain lions, turkeys, and numerous trees and plants. In doing so we have developed various economic enterprises to bring much needed revenues into the Reservation economies and are currently planning various energy systems to provide critical resources and economic sovereignty on the Reservation.

Utilizing the Governmental authority and our constitutional framework to regulate and provide critical services for our people, our Tribal leaders work toward developing and controlling our own utility services for our community. These services will provide energy generation, distribution, consumption, and pricing to meet the needs of our people, honor the earth, and protect our spiritual, cultural, and economic basis for future generations. This development is an important expression of tribal sovereignty and an inherent authority of the Tribe.

Our Tribal government began this process by establishing an overarching energy strategy focused on the Tribal goals to secure energy reliability, affordability and sovereignty. This strategy created an Energy Team and identified various projects that could help to achieve these goals. The Energy Team and the projects were approved by San Carlos Council and include community solar, residential solar, a microgrid to serve our hospital and San Carlos community, along with the future development of large scale solar to further support the needs of the Reservation and for the future potential to create revenue opportunities from other communities on or near the Reservation. This strategy further incorporated the vision to expand our current San Carlos Apache Tribal Utility, which now provides internet services to our community, to expand and provide much needed power services. In addition, we are working to create community wide energy efficiency within our government and residential communities, along with identifying conservation opportunities to protect and enhance their beautiful lands. The Energy Team is developing the projects approved by the San Carlos Council and is further completing a detailed Energy Plan encompassing the strategy and other ongoing energy studies and applications.

1.2 CPRG Process

[2] The Tribe's right to power is set forth in the Act of March 7, 1928 (45 Stat. 210-212), as amended, which reserved "power for agency and school purposes and for pumping irrigation by Indians on the San Carlos Reservation at a cost not exceeding 2 mils per kilowatt hour delivered at the switchboard at the Coolidge Dam." This provision was reinforced by the San Carlos Indian Irrigation Project Divestiture Act of 1991 ("1991 Act"), whereby Congress noted the "existing obligation" to provide the Tribe "power at the rate of 2 mils per kilowatt hour for irrigation pumping and agency and school purposes pursuant to the Act of March 8, 1928." P.L. 102-231, 105 Stat. 1722 §10 (9)(c)(1991).

This EPA Climate Pollution Reduction Grant (CPRG) program consists of a planning phase and a subsequent implementation phase. The San Carlos Apache Nation was awarded funding for the planning phase and has used the funding to develop this Priority Climate Action Plan (PCAP) with a focus on implementation-ready priority greenhouse gas (GHG) reduction measures. A Comprehensive Climate Action Plan (CCAP) will be developed before the end of the grant period and will provide a comprehensive overview of the significant GHG sources/sinks and sectors, establish near-term and long-term GHG emissions reduction goals, and provide strategies to meet these goals. The timeline for the planning phase will cover two separate efforts over thirty (30) months. Between November 2023 and April 2024, the team will be working to complete the PCAP and identify GHG reduction measures that could receive funding under the implementation phase of the CPRG. The CCAP effort will begin in Spring 2024 with a more substantial emphasis on community engagement and a more rigorous GHG Inventory.

The Tribe intends to use this CPRG planning grant to build upon the decisions already made by the Tribe related to energy independence and sovereignty. Because significant planning work has already been coordinated, this planning grant nicely compliments that work by indicating the environmental and GHG related impacts of all planning efforts.

2. Green House Gas Inventory

This PCAP is being developed to estimate GHG emissions produced on the San Carlos Apache Reservation, including those produced by the Tribe (and its members) and those produced by non-tribal entities. This information will be useful in the Tribe's decisions related to our energy strategy which will have lasting impacts on our future generations.

No previous comprehensive report of GHGs from the San Carlos Apache Reservation exists. Because 79.7% of Gross total U.S. GHG emissions by gas are from CO2[4], for purposes of this PCAP, the Tribe focused on CO2 emissions. Data sources for this PCAP include:

- State-level GHG inventories prepared by the EPA [5]
- Greenhouse Gas Equivalencies Calculator [6]

Quality Control: For the PCAP, data was sourced from public government data and from the tribe's known information. Other estimates were developed during meetings with tribal leaders. EPA Tools were utilized to estimate CO2 emissions. For the CCAP, data analysis will be completed under this project. Comparison data may be used for verification. Spreadsheets may be used to store data and complete any necessary

[4] EPA (2024) Draft Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2022. U.S. Environmental Protection Agency, EPA 430-D-24-001, page 2-3. https://www.epa.gov/system/files/documents/2024-02/us-ghg-inventory-2024-main-text.pdf.
[5] *Id.*
[6] https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator.

analyses. All data and methodologies specific to this analysis will be defined and documented. Tables and fields will be clearly and unambiguously named. Spreadsheets will be checked to ensure algorithms call data correctly and units of measure are internally consistent. Hand-entered or electronically transferred data will be checked to ensure the data are accurately transcribed and transferred.

2.1 Electricity Sector

Currently, there are three energy providers on the San Carlos Apache Reservation. First, is the San Carlos Irrigation Project (SCIP), a federally owned electric utility that covers parts of Pinal and Graham Counties. SCIP purchases Parker-Davis Project ("P-DP") Firm Electric Service and Salt Lake City Area/Integrated Projects ("SLCA/IP") power from the Western Area Power Administration ("Western"), and supplemental power from various other providers. As SCIP is not considered a large-scale utility and is not mandated to provide annual GHG inventories to the EPA, they do have an available inventory to be considered in this PCAP.

Second, the Tribe is also served by Graham County Electric Cooperative which provides electricity to the southeastern portion of the Reservation. The Graham County Electric Cooperative is managed by a nine-member Board of Directors and part of a national network of electric cooperatives, Touchstone Energy Cooperatives. Graham County Electric Cooperative also does not have a GHG inventory available to be considered in this PCAP.

Third, APS (Arizona Public Service) is another provider to the San Carlos Apache Reservation. APS does not have a GHG inventory, yet they do have a clean energy plan and are committed to being 100% clean and carbon free by 2050, while providing reliable and affordable energy to meet customer need.

The electric use on the Reservation is included in the Housing and Commercial Sector reports, below.

2.2 Housing Sector

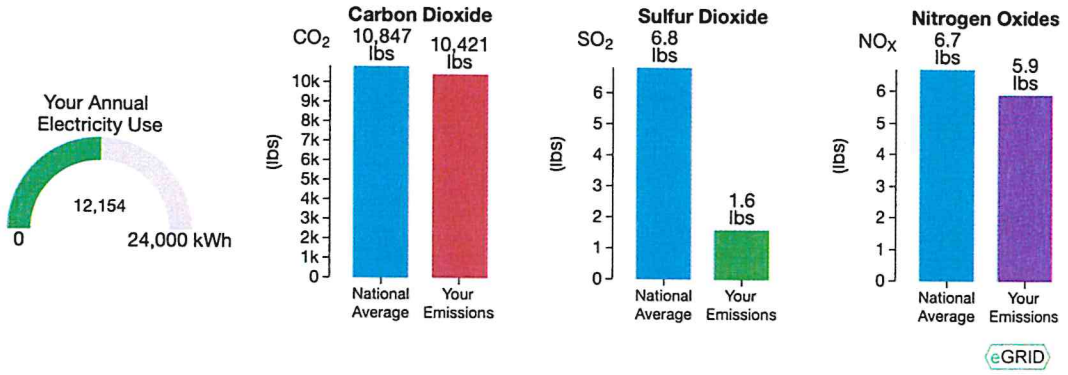
The 2020 census indicates a total population of 10,204 on the Reservation, and an estimated 2,519 occupied housing units.

Overview

According to EPA's Power Profiler for the Arizona region,[7] the national average electricity use, per household, per year is 12,154kWh. Multiplied by the number of housing units, this equals 30,615,926kWh (30,616 MWH) per year.

In the AZNM region, this results in 10,421 lbs of CO2 annually per household. Multiplied by the Reservation households, this equals **26,250,499 lbs. (11,907 tons) of CO2 annually.**

[7] https://www.epa.gov/egrid/power-profiler#/AZNM.



Details

We are assuming 40% of the homes on the Reservation have wood, coal, or other stationary combustion. Therefore, we assume 1,008 homes have fireplace combustion. There is often a haze on cold days without wind. Residents prefer the use of wood stoves over other forms of heat. Firewood is purchased and sold on the Reservation by the Forestry Department. Woodcutting permits are also available for tribal members.

We are assuming 60% of these homes have natural or propane gas stationary combustion. Therefore, we assume 1,511 homes have natural gas combustion. Natural gas is available on the Reservation. Most new developments have gas hookups. Other homes use propane.

2.3 Commercial/Governmental Sector

Data shown in this section is estimated using EPA's Power Profiler for the Arizona region.[8] Based on the available EPA tools, we estimate a total of **22,893,063 lbs. (10,384 tons) of CO2** is emitted annually from the Commercial Government Sector on the Reservation.

Tribal Government Properties

Overview

Based on insurance records, the total square footage of Tribal Government Properties is 569,389. The national average electricity use, for commercial customers for 569,389 square feet is 12,214,247 kWh (12,214 MWH). In the AZNM region, this results in **6,151,439 lbs. (2,790 tons) of CO2 annually**.

Details

"Tribal Government Properties" include buildings owned and operated by the tribal government (not federal buildings, and not tribal enterprise owned or operated buildings.

[8] https://www.epa.gov/egrid/power-profiler#/AZNM.

Larger Tribal properties include:

Four (4) buildings over 20,000 square feet.

1. San Carlos Training Institute (28,905 sq. ft.)
2. Law Enforcement (21,200 sq. ft.)
3. Gilson Wash Community Center (20,200 sq. ft.)

Government Center/Tribal Administration (35,458 sq. ft.)

Thirteen (13) additional buildings that are 10,000 square feet or greater, including.

Six (6) Community Centers

Gym

There are numerous other smaller Tribal Government Properties.

Non-Tribal Government Properties on the Reservation

Overview

Non-Tribal properties for which data is available show a total of 490,124 square feet. We assume that other government or commercial enterprises for which we do not have data are double the tribal properties (569,389 sq. ft.) plus the Non-Tribal Properties for which data is available (490,124 sq. ft.), equaling a total of 1,059,513 square feet. We therefore estimate that the square footage of Commercial and Government buildings on the Reservation is 1,549,637. The national average electricity use, for commercial customers for 1,549,637 square feet is 19,525,420 kWh (19,525 MWH). In the AZNM region, this results in **16,741,624 lbs. (7,594 tons) of CO2 annually**.

Details

Non-Tribal Properties for which data is available include:

1. Apache Gold Casino Complex
   a. Casino (75,535 sq. ft.)
   b. Hotel (45,638 sq. ft.)
   c. Pool Dressing Room (5,143 sq. ft.)
   d. Maintenance (12,411.27 sq. ft.)
   e. Golf Shop (4,620.23 sq. ft.)
   f. Event Center (87,308.33 sq. ft.)
2. Casino Chevron Convenience Store (8,297.47 sq. ft.)
3. Peridot District Shopping Center (estimate 46,000 sq. ft.)
4. San Carlos Apache Forest Products (Sawmill) (14,566 sq. ft.)
5. School District Offices: San Carlos Unified School District

   BUILDING 1 – 35,328 sq. ft.

BUILDING 2 – 42,854 sq. ft.

BUILDING 3 – 62,334 sq. ft.

BUILDING 4 – 50,089 sq. ft..

Other Government or Commercial Enterprises for which we do not have data.

Including tribally owned entities, private entities, federal buildings and others:

Bureau of Indian Affairs

Six Primary Schools, including:

Peridot Mission (Grades 1 to 8)

St. Charles (Grades 1 to 6)

Mt. Turnbull Academy (Grades 9 to 12)

Ft. Thomas Unified (Grades 1 to 5)

Baptist Academy (Grades 1 to 4)

San Carlos Unified (Grades 1 to 12)

High School

Hospital Complex

SCATUI- Telephone/Utility Enterprise

Other Commercial and Government Buildings.

2.4 Transportation Sector

Overview

All reported emissions were determined using the EPA Greenhouse Gas Equivalencies Calculator.[9]

Personal Vehicles

For purposes of the PCAP, we are assuming 2 vehicles per household, for a total of 5,038 personal vehicles. this results in **23,334 tons of CO2 equivalent in annual emissions**.

For future use, the Tribe estimates each personal vehicle travels 45,000 Vehicle Miles Traveled per year.

Tribally Government Owned Vehicles

[9] https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator#results.

According to the Tribe's insurance records, there are 612 government vehicles. Of these, 33 are trailers, so the total of fuel using vehicles is 579. This results in **4,765 tons of CO2** equivalent in annual emissions as broken out below.

- 129 passenger, light duty or motorcycles, resulting in 597 tons of CO2 equivalent in annual emissions.
- 450 are trucks, buses, and larger vehicles, which we assume have double gasoline usage and therefore the emissions passenger or light duty vehicles. This results in 2x 2,084 tons or 4,168 tons of CO2 in annual emissions.

Non-Tribal Government Owned Fleet Vehicles

We estimate non-Tribal fleet vehicles make up an additional 35% of the tribal vehicles, resulting in 203 additional fleet vehicles. Most of these are trucks, busses, and larger vehicles, which we assume have double gasoline usage and therefore the emissions passenger or light duty vehicles. This results in 2x 2084 tons or **940 tons** of CO2 in annual emissions. These include vehicles used at the following facilities.

School

Hospital

Casino

SCATUI

2.5 Industrial/Agricultural

Estimates of CO2 emissions from the Tribe's agricultural practices will be addressed in the CCAP.

Forestry

The Tribal Sawmill is the industrial facility on the Reservation. The Sawmill produces 30,000 board feet/month from tribal forests. This is equivalent to 4 semi-truck loads/day that weigh 40,000 per load. The distance traveled from the forest to the Sawmill is 120 miles from forest to sawmill.

Farming

Activities such as tilling of fields, planting of crops, and shipment of products cause carbon dioxide emissions. Carbon dioxide is emitted by farm equipment moving across the farm's fields during tilling, planting, the application of pesticides and fertilizers and harvest. The more passes across the farm field, the more carbon that is emitted. Another source of carbon dioxide is the shipment of foods and grains from the fields to the markets.

Agriculture-related emissions of carbon dioxide account for around 10% of global greenhouse gas emissions.[10]

The Tribal farm produces alfalfa from irrigated fields. There are two major tribal farms.

- First Farm – 7.7m sq. ft. for farmland.
- Chinatown Farm – 2.2m sq. ft. farmland

2.6 Totals

The following table summarizes the CO2 emissions described above.

Sector	CO2 Emissions
Housing	**(26,250,499 lbs.) 11,907 tons of CO2 annually**
Government/Commercial	**(16,741,624 lbs.) 7,594 tons of CO2 annually**
Transportation	**29,039 tons of CO2 annually**
TOTAL	**48,540 tons of CO2 annually**

3. Quantified GHG Reduction Measures

The Tribe explored and considered the following measures to reduce or mitigate GHG emissions. These measures are consistent with the Tribe's energy strategy. The Tribe's energy strategy for Reservation wide clean renewable resilient power involves the development of community solar with energy storage, a hospital microgrid, increasing the number of Tribal homes with zero emission electricity generation, and a utility scale solar project to be operated and managed by the San Carlos Apache Tribal Utility Authority. This vision is becoming a reality, with grant applications already submitted for the expansion of the Tribal Utility Authority, for the Community solar, hospital microgrid and for increasing the number of Tribal homes with zero emission electricity generation. This PCAP supports the upcoming implementation grant, which will further support development of the Utility scale solar project, increasing residential applications, and furthering energy efficiency within our government buildings and homesites.

The following Measures are consistent with the Tribe's energy strategy and this EPA CPRG program.

3.1 Community Solar Microgrid Serving the Town of San Carlos

[10] https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions.

The Tribe is planning to build a community solar microgrid to serve the rural town of San Carlos on the San Carlos Apache Reservation, sited approximately 20 miles east of Globe, Arizona. The Town of San Carlos, located at the end of the San Carlos Irrigation Project (SCIP) electric utility, a Federally owned electric utility, routinely experiences power outages and voltage drops that threaten the ability to serve its residents and cultivate economic growth. More importantly, the current energy arrangement on the Reservation is a threat to the Tribe's sovereignty: without energy independence and reliable access to power, the Tribe is unable to provide critical services and economic opportunities to its members. The planned microgrid will consist of 10 MW solar PV array with 6MW/12MWh battery energy storage and microgrid controller system to serve the San Carlos municipal core. The project will provide continuous resilient and renewable power to the San Carlos municipal core site, which includes critical service buildings that currently face brown outs.

In addition, because the approximately fifty (50) residences which will be connected to the community microgrid are not energy efficient, the project will include residential renovations, retrofits, and energy efficient upgrades. This subproject is intended to mitigate and alleviate continual power outages and high costs and is intended to help achieve energy sovereignty for the town of San Carlos.

Total project costs are $12,500,000.

Additional funding sources include:

- DOE OCED (application denied, however we could resubmit.)
- US DOI BIA Tribal Electrification Program (partially awarded for planning purposes.)
- US Treasury direct pay (for solar and batteries)
- US DOE Tribal Energy Efficiency and Conservation Block Grant
- US DOE Tribal Home Electrification and Appliance Rebates Program
- US DOE Clean Energy Deployment on Tribal Lands

Emissions Reductions

Emission Reductions include the equivalent of the emissions from fifty (50) residences. Using the EPA tools described above for the AZNM region, 10,421 lbs. of CO2 annually per household times fifty (50) households results in an emissions reduction of **520,600 lbs. (236 tons) of CO2 annually**.

Additional emissions reductions include approximately one-half of the total square footage of Tribal Government Properties (284,695 sq. ft.). One half of the emissions described above for Tribal Government Properties is **3,075,720 lbs. (1,395 tons) of CO2 annually.**

We estimate this measure will reduce emissions by 3,596,320 lbs. (1631 tons) of CO2 annually.

3.2 Residential Upgrades

The Tribe's energy strategy includes a program to upgrade 150 existing homes on the Reservation which are outside of the town of San Carlos. This project will fund, in the amount of $6,750,000, housing upgrades

and retrofits using data and the plan with criteria developed through a separately funded energy education and engagement program. The contractor will implement the first phase of the plan by upgrading the first 150 existing homes outside of the town of San Carlos. These outlying communities experience high electricity costs which are not affordable for many residences. Energy audits of participating homes will determine needed energy efficiency measures such as new roofs, windows, insulation, appliances, lighting, heat pumps, other heating or cooling systems, passive solar, tree planting, etc. Solar panels and batteries will be considered where appropriate. We anticipate an average cost of $45,000 per home.

The community residential energy efficiency project includes ways to ensure that homes served by the microgrid are electrified and efficient in addition it provides for residential renovations, retrofits, and energy efficient upgrades to existing homes. It will include converting homes from propane or other fossil fuel heating systems to heat pumps. The installation of high efficiency heat pumps will eliminate the use of window mounted air conditioners that are not energy efficient. This plan also incorporates improvements to the home envelope ranging from simple weatherization to windows and insulation upgrades to improve the efficiency of the homes. Also included will be electrical and vent upgrades to accommodate converting from either electric resistance or propane hot water heaters to heat pump water heaters. Other miscellaneous upgrades were also considered on this project, for appliance upgrades, enhanced metering and integrating each house thermostat and controls with microgrid controls.

Benefits of this plan include widespread community enthusiasm for residential upgrades as expressed to Tribal Council members, improved quality of life in addition to energy and GHG improvements, known technologies, and ability to assure widespread use of this program. Opportunities for jobs to construct and install the measures will be made available. Cons of the program include privacy concerns of residents for energy auditors on their properties, and possible inability to meet all the needs.

Other funding sources include:

- US DOI BIA Tribal Electrification Program (application partially awarded for planning purposes);
- US Treasury direct pay (for solar and batteries)
- US DOE Tribal Energy Efficiency and Conservation Block Grant
- US DOE Tribal Home Electrification and Appliance Rebates Program
- US DOE Clean Energy Deployment on Tribal Lands

Emissions Reductions

Emission Reductions include the equivalent of one half of the emissions from 150 residences. Using the EPA tools described above for the AZNM region, 10,421 lbs of CO2 annually per household times 150, then divided by 2 equals an emissions reduction of **781,575 lbs. (354 tons) of CO2 annually.**

3.3 Utility Scale Solar

The Tribe has solicited proposals from qualified contractors to develop, operate, and maintain an approximately 500MW+ utility-scale solar project and to develop, as needed, related interconnection and transmission infrastructure which can deliver the project power to a planned interconnecting substation, or

an alternative high voltage substation. The Tribe and the United States Department of Energy conducted an Energy Organization Analysis and Solar Feasibility Study which identified a preferred area on Peridot Mesa in San Carlos, AZ for the utility-scale solar project. The preferred installation area is approximately 1,550 acres. The contractor is expected to assist the Tribe in the financing and/or financial arrangements for the project.

Benefits of utility scale solar on the San Carlos Reservation include providing a source of income to the Tribe and offsetting carbon emissions. It will provide stable, reliable, and affordable power to the utility market. Cons include the lead time to development and requirement to work with outside developers which lessens the tribe's equity ownership in the project.

The United States Energy Information Administration published the below chart in its Levelized Costs of New Generation Resources in the Annual Energy Outlook 2022.[11] The chart shows that for the total cost (Levelized Cost of Electricity or LCOE) for new non-dispatchable, utility-scale energy projects that come online in 2027, standalone solar has the lowest cost at $33.83/MWH.

Table 1b. Estimated unweighted levelized cost of electricity (LCOE) and levelized cost of storage (LCOS) for new resources entering service in 2027 (2021 dollars per megawatthour)

Plant type	Capacity factor (percent)	Levelized capital cost	Levelized fixed O&M[a]	Levelized variable cost	Levelized transmis-sion cost	Total system LCOE or LCOS	Levelized tax credit[b]	Total LCOE or LCOS including tax credit
Dispatchable technologies								
Ultra-supercritical coal	85%	$52.11	$5.71	$23.67	$1.12	$82.61	NA	$82.61
Combined cycle	87%	$9.36	$1.68	$27.77	$1.14	$39.94	NA	$39.94
Advanced nuclear	90%	$60.71	$16.15	$10.30	$1.08	$88.24	-$6.52	$81.71
Geothermal	90%	$22.04	$15.18	$1.21	$1.40	$39.82	-$2.20	$37.62
Biomass	83%	$40.80	$18.10	$30.07	$1.19	$90.17	NA	$90.17
Resource-constrained technologies								
Wind, onshore	41%	$29.90	$7.70	$0.00	$2.63	$40.23	NA	$40.23
Wind, offshore	44%	$103.77	$30.17	$0.00	$2.57	$136.51	-$31.13	$105.38
Solar, standalone[c]	29%	$26.60	$6.38	$0.00	$3.52	$36.49	-$2.66	$33.83
Solar, hybrid[c,d]	28%	$34.98	$13.92	$0.00	$3.63	$52.53	-$3.50	$49.03
Hydroelectric[d]	54%	$46.58	$11.48	$4.13	$2.08	$64.27	NA	$64.27
Capacity resource technologies								
Combustion turbine	10%	$53.78	$8.37	$45.83	$9.89	$117.86	NA	$117.86
Battery storage	10%	$64.03	$29.64	$24.83	$10.05	$128.55	NA	$128.55

Source: U.S. Energy Information Administration, *Annual Energy Outlook 2022*

[a] O&M = operations and maintenance

[b] The tax credit component is based on targeted federal tax credits such as the Production Tax Credit (PTC) or Investment Tax Credit (ITC) available for some technologies. It reflects tax credits available only for plants entering service in 2027 and the substantial phaseout of both the PTC and ITC as scheduled under current law. Technologies not eligible for PTC or ITC are indicated as *NA*, or *not available*. The results are based on a regional model, and state or local incentives are not included in LCOE and LCOS calculations. See text box on page 2 for details on how the tax credits are represented in the model.

[c] Technology is assumed to be photovoltaic (PV) with single-axis tracking. The solar hybrid system is a single-axis PV system coupled with a four-hour battery storage system. Costs are expressed in terms of net AC (alternating current) power available to the grid for the installed capacity.

[d] As modeled, we assume that hydroelectric and hybrid solar PV generating assets have seasonal and diurnal storage, respectively, so that they can be dispatched within a season or a day, but overall operation is limited by resource availability by site and season for hydroelectric and by daytime for hybrid solar PV.

Other funding sources include private capital from the project developers and clean energy tax credits.

[11] See: https://www.eia.gov/outlooks/aeo/electricity_generation.php.

Assuming a solar capacity factor of 24.5%, one MW of solar panels is estimated to produce 2,146MWH of energy.[12] Therefore, an initial phase of a 250MW system will produce 536,500 MWH annually. Using EPA's AZNM emissions rates[13] shown below, 1MWH produces 819.7lbs of CO2. Therefore, a 250MW system would offset **439,769,050 lbs. (199,476 tons) of CO2 annually.**

AZNM Emission Rates

CO_2	SO_2	NO_x
819.7	0.128	0.463

3.4 Electric Vehicle Program

The San Carlos Apache Tribe proposes an Electric Vehicle Program to, among other purposes, reduce greenhouse gas emissions on the Reservation. Currently on the Reservation there is only one slow (level one) charging station. There are only a handful of electric cars. The Tribe proposes to make 244 (40%) of its existing fleet electric. This is the equivalent of 10,980,000 miles driven per year (244x45,000). Based upon a review of DOE's fueleconomy.gov (DOE 2023) and conservative best estimates, an average of recorded efficiencies (kWh/100 miles) among fully electric vehicles (Model Year 2000-2023) is determined to be 35.7 kWh/100 miles. The number of miles driven by an electric vehicle is estimated by multiplying the annual amount of green power procured in kilowatt-hours (kWh) by [100 miles/35.7 kWh].

The Tribe estimates this will require 25 level 2 chargers to service the government fleet.

Other funding sources include the U.S. Department of Energy, U.S. Department of Transportation, and U.S. Department of Interior.

4. Benefits Analysis

The San Carlos Apache Tribe established a vision and goals for strengthening its sovereignty, resiliency, energy security, and economic independency by developing renewal energy generation and distribution for their Tribal community and beyond. These goals reduce the current threat to the Tribe's sovereignty by creating energy independence through the expansion of the San Carlos Apache Tribal Utility Authority to include management and operation of the Tribe's energy utilities. In addition, by developing clean renewable technologies that serve the community, we can protect our earth and air and provide the critical services and economic opportunities to build a future for our people for generations to come.

In the San Carlos Apache Tribal Strategic Plan, as amended, energy development was proposed as key economic development undertakings. The Tribe's Energy Team is currently in the process of establishing an Energy Plan that defines energy development activities to include clean renewable resilient power using the future in energy development. This plan will include microgrid power systems and reflect the expansion of the current Tribal Utility to oversee and manage energy services on the Reservation. The current energy

[12] https://www.freeingenergy.com/math/solar-pv-gwh-per-mw-power-energy-mwh-m147/.
[13] https://www.epa.gov/egrid/power-profiler#/AZNM.

vision presents four major systems to include a community and hospital microgrid, tribal utility, homeowner education, home retrofits and upgrades and a utility scale solar project.

The Tribe has approved four San Carlos Council Resolutions directing the approaches set forth in this PCAP. They include:

- San Carlos Apache Tribal Resolution No.JA-23-002 Approving Electric Generation and Distribution Project & Approving Clean Energy Deployment on Tribal Lands Application
- San Carlos Apache Tribal Resolution No. JA-23-016 Approving Solar Power Development Projects
- San Carlos Apache Tribal Resolution No. JA-23-209 Approving the Tribe's Tribal Electrification Program
- San Carlos Apache Tribal Resolution No. JA-23-210 Approving the Tribe's Tribal Energy Development Capacity Program

The San Carlos Apache are focused on energy development that is good for the community by providing stable, reliable, and affordable service but also provides energy in a manner that honors and respects our earth and our air. The Tribe's energy strategy incorporates energy projects that support this focus.

5. Authority

Pursuant to the attached Tribal Council Resolution DC-23-209, the San Carlos Apache Tribe is a federally recognized Indian Tribe organized pursuant to the provisions of the Indian Reorganization Act of June 18, 1934 (48 Stat. 984) and has the authority, among other things, to "represent the Tribe and act in all matters that concern the welfare of the Tribe, and to make decisions not inconsistent with or contrary to [the Tribe's] Constitution and Bylaws," to "negotiate and make contracts," and to advise the Secretary of Interior … on all activities that may affect the San Carlos Reservation … and Federal projects for the benefit of the Tribe," pursuant to Article V, Sections 1(a), (b), and (c) of the Amended Constitution and By-Laws of the San Carlos Apache Tribe.

6. Workforce Training

The San Carlos Apache Tribe's Tribal Employment Rights Ordinance, was developed in 1988 (TERO No.88-04, as amended). This Ordinance was put in place to create opportunities for the Tribe's members through regulations that provide preference to Tribal members in contracting, employment, and training when there are qualified Tribal members available. A Workforce Development Plan will be created and will identify all anticipated opportunities on this project both in implementation and operation, as well as will identify the current Tribal workforce available to be utilized on this project. In addition, it will create a workforce training plan that will identify all potential positions that Tribal members can be trained to fill.

The Workforce Development Plan will assist contractors during the construction phase, as well as with SCATUI, SCAT Housing, and other tribal companies on both temporary and permanent ongoing positions. The Plan will establish a headcount of positions needed for each phase of work and will then assess the current availability of Tribal member workers based on skills and experience. In addition, potential training opportunities will be identified, as well as personnel available for skills training and training plan will be created to assure continued availability of workforce for continued operations. At all times, SCATUI will coordinate with the Tribe's Housing staff, and other tribal companies and interested parties within the tribal departments.

A full review of anticipated workforce upon turnover to operations will assure priority is provided to all available Tribal members who meet the necessary skill levels, and will also include a workforce training plan to assure Tribal members are provided preference in not only the employment but in the training for future employment.