One Megawatt Solar Array for Grand Canyon West

LAND AREA FOR ARRAY: 3.7 ACRES

PROJECT BUDGET: $3,690,000

DEPARTMENT OF ENERGY GRANT: $2,430,000 (DE-IE0000128)

TRIBAL MATCH: $1,260,000 FROM VARIOUS SOURCES INCLUDING FREEPORT MCMORAN

Prepared for: Department of Energy, Office of Indian Energy
Prepared by: Hualapai Tribal Utility Authority and Planning Dept.
November 18, 2021

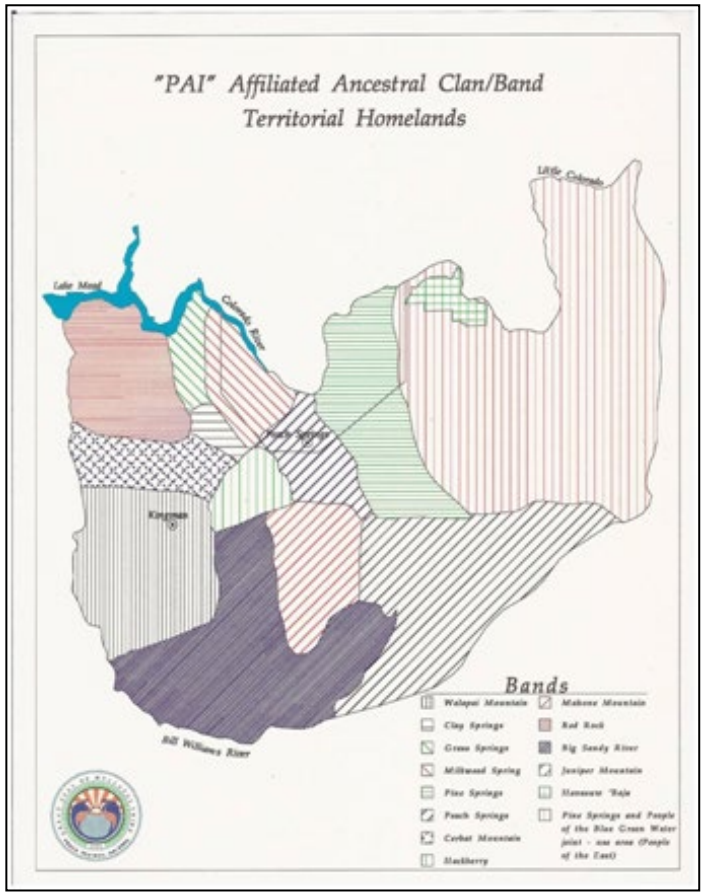
Introduction to Hualapai

The People of the Tall Pines, 2,400 enrolled members as of October 22, 2021, with 1,302 members living on the Reservation and in Valentine.

Reservation comprises approximately one million acres established by Executive Order in 1883.

Traditionally, Hualapai inhabited an area up to seven million acres, with archeological evidence dating to 600 AD.

The homeland stretched from the Grand Canyon southward to the Bill Williams and Santa Maria Rivers and from the Black Mountains eastward to the San Francisco Peaks located near what is today Flagstaff, Arizona.



Hualapai Population

Population

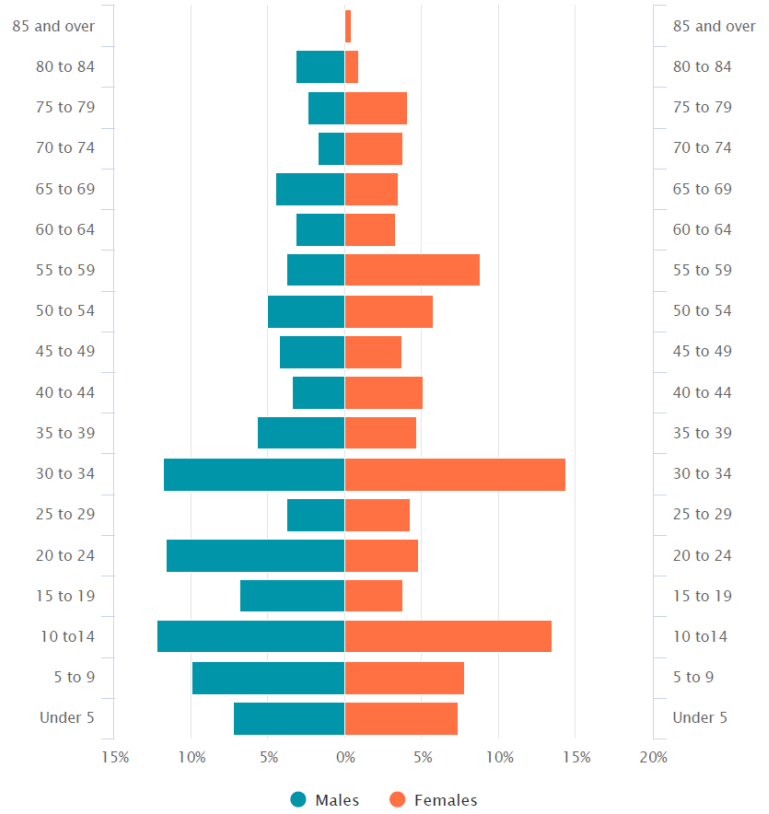
- 1,299 people living on reservation and 37 residing in Valentine
- Median age is 30.9 years
- Average household size is 3.38 persons
- 25% of adults do not have a high school diploma

Employment & Poverty

- Sectors include arts & entertainment, education, transportation, and government
- Labor participation is 45% for those 16 years of age and older.
- Under employment rate = 20.4% (pre-Pandemic)
- Median Annual Income = $34,000
- Poverty rate = 34.7%

Housing

- 405 dwelling units in Peach Springs and 19 in Valentine
- $54,000 median home value (91% SFDUs)



Source: 2020 Census and
2015-2019 American Community Survey

Grand Canyon Resort Corporation Profile

Founded in 1988 with operations in Peach Springs and Grand Canyon West to administer several enterprises employing 350 full and part-time employees as follows:

Grand Canyon West- Skywalk & Western Town

Hualapai River Runners & Pontoons

Hualapai Lodge & Diamond Creek Restaurant

Walapai Market and Fuel Station

Approximately 5,000 tourists take the rafting trip each year with most staying at the Hualapai Lodge in Peach Springs the night before.

Visitation to Grand Canyon West averaged some 1,000,000 persons per year from 2015 thru 2019. Visitation for the first 9 months of 2021 is 472,000 as the tourist industry recovers from the Pandemic.

Project Summary

In 2014, the tribal council formed the Hualapai Tribal Utility Authority to bring electricity to GCW, via a new 69 KV line from an off-reservation utility. Currently, diesel generators provide electric service.

The micro-grid's generators, also commissioned in 2014, have an extremely high operating cost and are prone to go offline for scheduled repairs which become more frequent after 20,000 hours of use. As development at GCW intensified, on-site generators have become impractical. After the numerous delays and setbacks of connecting to the grid, the Tribe began exploring solar option.

The goal of the project is to improve the resilience of the non-grid-connected electrical generation system at GCW to withstand short-term disruptions and rising energy costs by installing a 993-kW solar PV and 750-kW/1500-kW battery storage system. The system will be capable of providing some 1,600 MWhrs per year (25 year lifetime average) or about 50% of the annual energy needed at GCW to supplement the existing diesel generator energized micro-grid, saving approximately $450,000 per year and over $11 million dollars over the 25-year life of the system.

Project Approach and Objectives

The Tribe's Technical Contact will:

1. oversee the procurement of a qualified construction company to install the solar array.
2. ensure that all permits are completed and that the project stays in compliance with the grant scope of work as well with all tribal and federal environmental regulations.
3. ensure that progress on the project is completed as scheduled and that all reporting related to this project is complete and submitted in a timely manner.
4. have an assistant who will be responsible for tracking the energy produced by the array as well as ensuring the system is operational.

Statement of Project Objectives submitted to DOE (Federal Fiscal Year)									
Milestone	3Q 2021	4Q 2021	1Q 2022	2Q 2022	3Q 2022	4Q 2022	1Q 2023	2Q 2023	3Q 2023
Pre-Construction									
Site Characterization									
Preliminary Design									
Engineering									
Procurement									
Construction									
Commissioning									
Monitoring									
Closeout									

Project Background from Conception through Initial Site Selection

Spring of 2019: HTUA requests staff to look into developing a solar project at Grand Canyon West to help power the micro-grid, save on diesel fuel costs and reduce emissions.

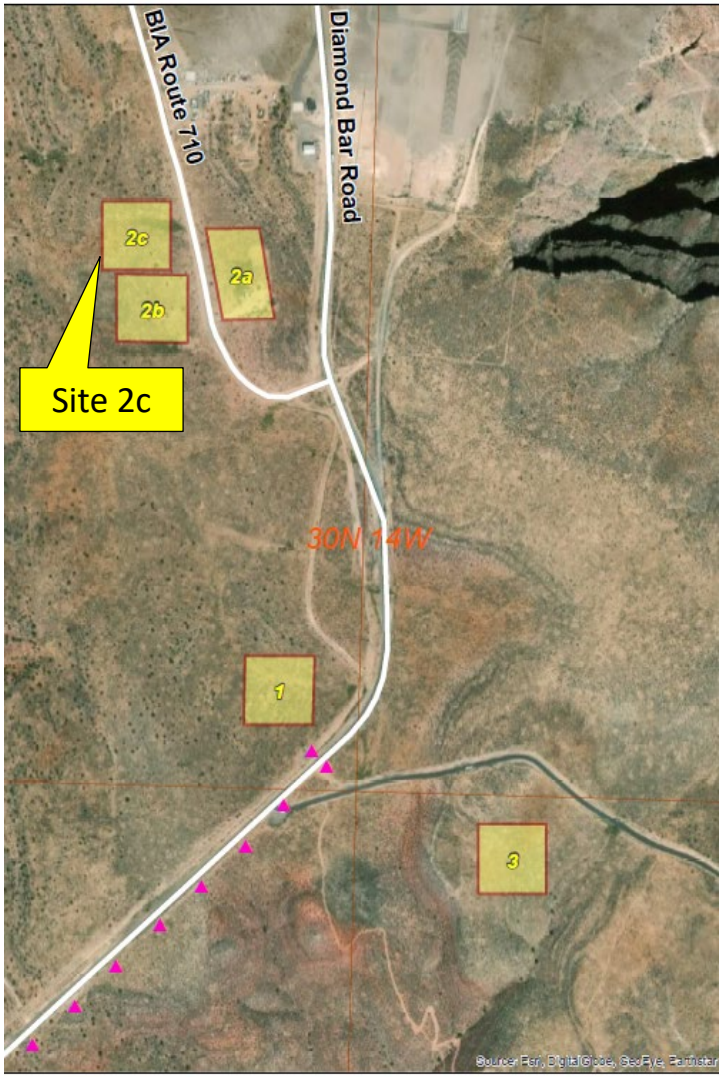
Summer of 2019: HTUA requested proposals from vendors to construct a 2 MW solar array at Grand Canyon West to cover 100% of micro-grid's output.

October 2019: Discussion with tribal council on the cost of the project led to a reduction in scope to a 1 MW solar array to offset 50% of micro-grid's energy needs. HTUA issues addendum Nos. 5 & 6 with Solon's proposal considered the most responsive & responsible.

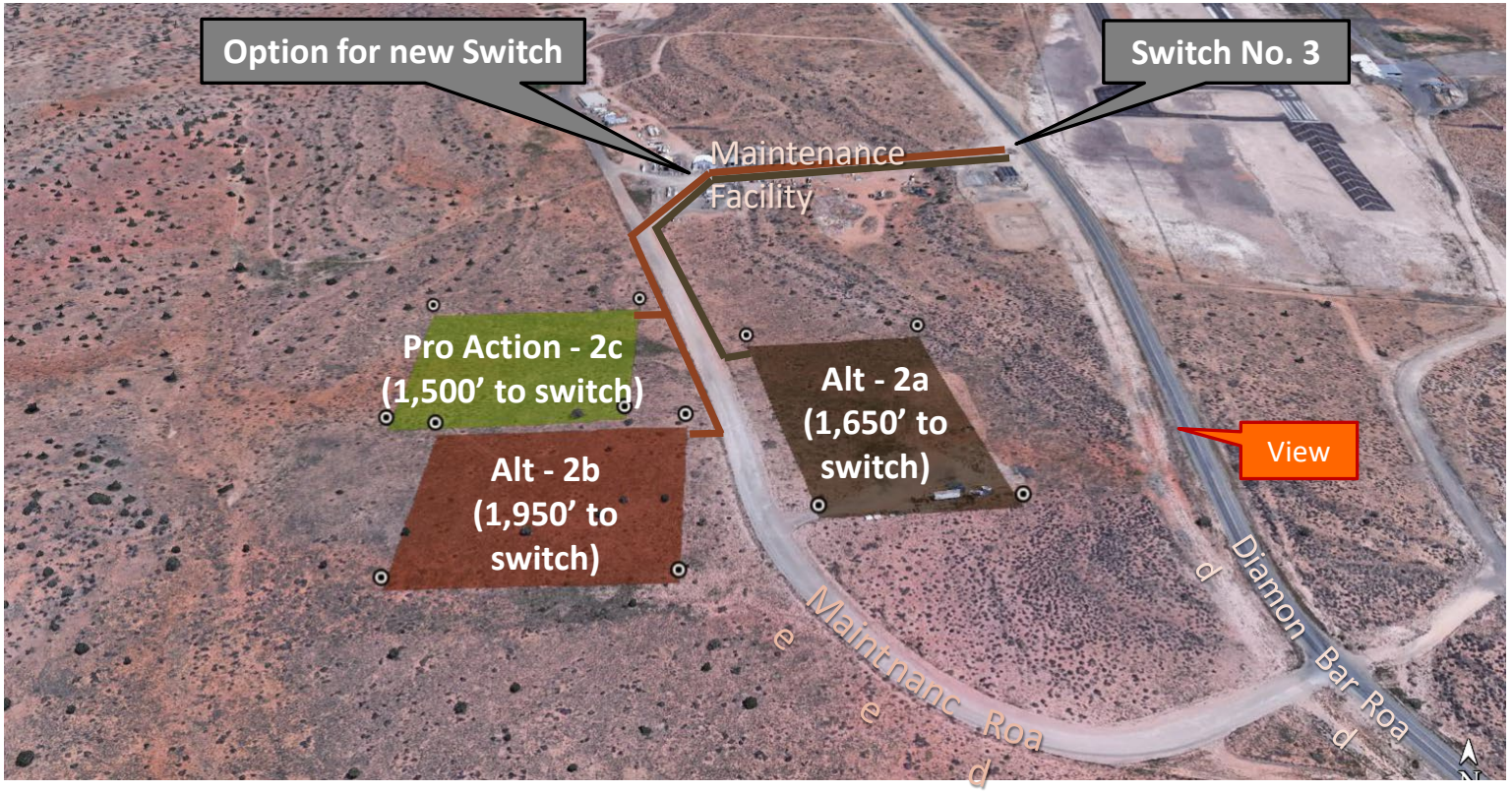
February 2020: Hualapai applies to DOE for a grant to fund a 1 MW solar array with lithium battery bank.

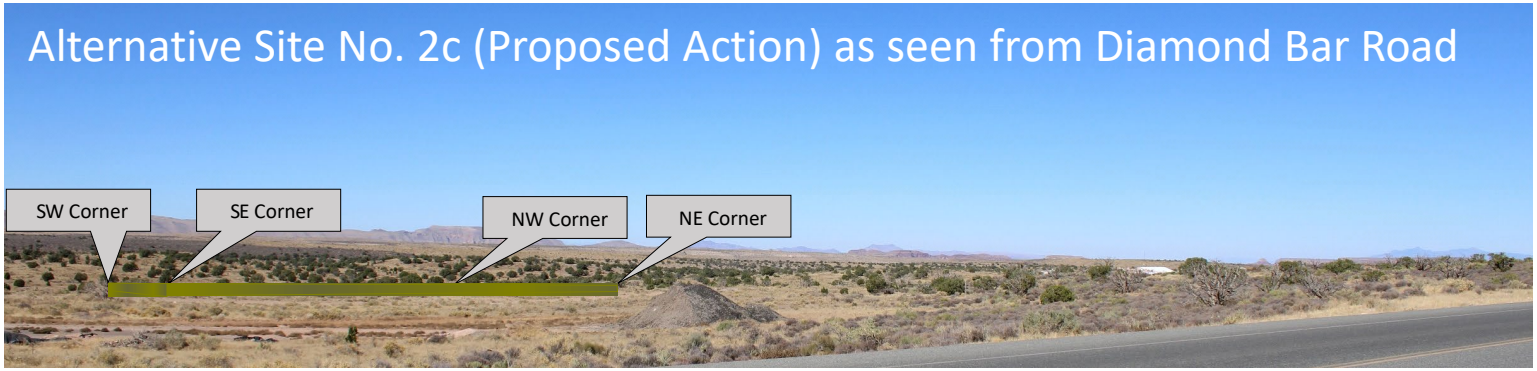
May 2020: DOE notifies tribe of successful application and begins negotiations on $2.7 million award w/ tribe contributing $1.35 million (50/50 match).

Summer of 2020: Planning begins work on EA with input from IDT, TERC, HTUA, GCRC, FAA and DOE. Public survey and radio interview done in November 2020 to discuss preferred location of solar array.



Solar Array Alternate Site Nos. 2a & 2b and 2c (Proposed Action)





Project Background Through Approval of Environmental Assessment

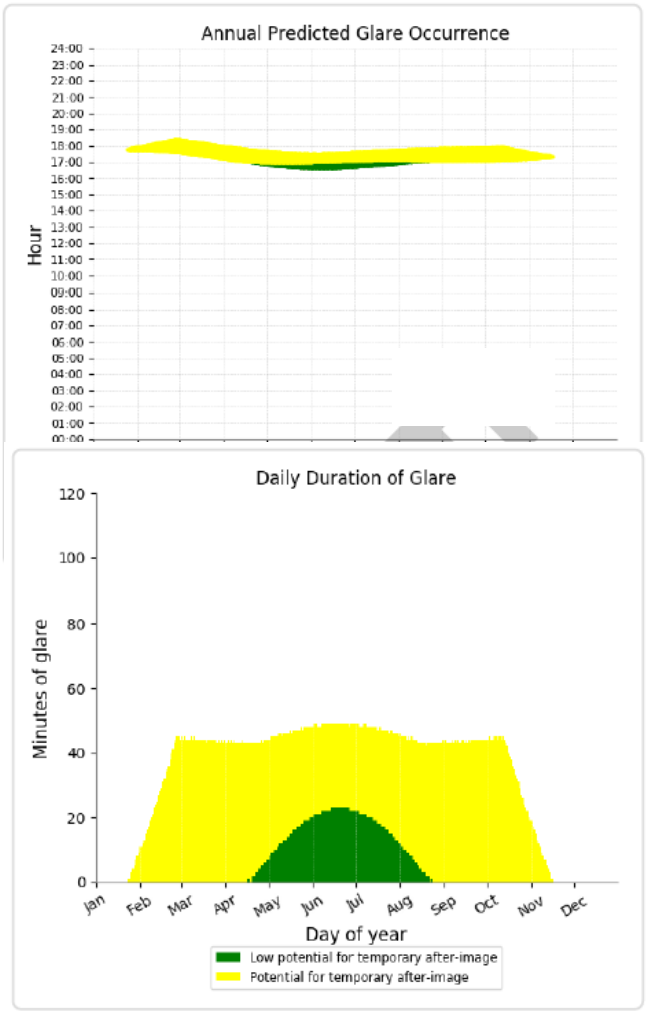
November 2020: Tribe requests reduction in cost share and receives approval from DOE for 10% match ($270,000) on December 29th.

December 2020: TERC reviews community surveys and preliminary glare analysis and recommends Site No. 2c as the Proposed Action in the draft EA. Site location adds $400,000 to project cost to extend 20.8 KV electrical line to nearest micro-grid switch.

February 2021: Draft EA distributed to IDT, TERC, HTUA, GCRC and tribal council for review and input.

April 27, 2021: Tribal Council recommends Site No. 2c which allows for future expansion for a 100% solar power solution at GCW.

May 19, 2021: TERC approves EA with FONSI signed in June. General Permit is pending council review upon completion of contract negotiations between vendor and HTUA.



Solar Array and Battery Storage Equipment

Concrete ballast mounted PV panels

Inverter/battery storage units

Project Status Since Approval of Environmental Assessment

July 2021: HTUA solicits third-party cost estimate which concludes some $2,705,983 to construct the fence line project.

August 2021: DOE's contracting officer approves Solon as the competitively selected vendor and approves the NEPA review by the tribe.

September 2021: Solon requests a price increase due to rise in aluminum, steel and copper prices bringing the cost to $2,967,589 ($3,190,158 with TERO tax and bonding). Price is still lower than bids received by other vendors in 2019.

October 2021: HTUA's estimate for off-site work to connect array to micro-grid increases from $400,000 to $500,000 (25% increase) based on Solon's cost increases.

Summer to Early Fall 2021: Contract with Solon reviewed and revised by HTUA Board and attorney at four meetings between June 22 and October 14 to address questions of tribal sovereignty.

November 6, 2021: Tribal council approves contract with Solon.

Payback-Fuel Savings and Maintenance

Solar array will supply 48% of the energy requirements for the GCW micro-grid and reduce other operating costs by 20%. (Labor-Service Contract)

CURRENT GCW Generator Operating Costs					Projected Yearly Savings	
		2018	2019	Average		
1. Diesel - Red Dye	Fuel	$1,048,751	$808,243	$928,497	$445,679	48%
2. Grid Generator Service Agreement	Maint.	$106,140	$113,464	$109,802	Note 1	20%
3. Grid generators - Labor Parts	Maint.	$228,000	$203,000	$215,500	Note 1	20%
	Total	$1,382,891	$1,124,707	$1,253,799	$445,679	Annual Savings

Note 1: Reduction in diesel generation Maint. costs offset by solar Maint. cost.

Hualapai Tribe will recover its $1,260,000 investment in approximately 35 months

Next Steps & Lessons Learned

1. Commence engineering work

2. Patience