

Final Technical Report Cover Page



Recipient Organization: Oglala Sioux (Lakota) Housing

Project Title: Oglala Omaste 2020

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Award Number: DE-IE0000129

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DOE Share: \$100,813

Recipient Cost Share: \$100,850

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Project Partner(s): GRID Alternatives

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1.0 Executive Summary

Oglala Lakota Housing Authority (OLHA), the tribally designated housing entity of the Oglala Sioux Tribe, installed solar photovoltaic (PV) systems on six tribal buildings, including the Oglala Lakota Housing Authority administration building, four Veterans Affairs Supportive Housing (HUD-VASH) homes, and one Rural Innovation Fund (RIF) home. Combined, the total solar PV capacity of this project is approximately 54 kilowatts-direct current (kW-DC), offsetting an estimated 74,176 kilowatt-hours (kWh) per year and saving OLHA and tenants of the tribally owned residences approximately \$8,226 annually. The lifetime savings of the project is estimated to be \$380,344. The project aligns with energy goals of OLHA and the Oglala Sioux Tribe to reduce energy costs for low rent tenants and to reduce our carbon footprint; both of which are in line with Lakota values.

2.0 Background

OLHA is the tribally designated housing entity of the Oglala Sioux Tribe on the Pine Ridge Reservation in South Dakota and holds the distinction of being the oldest tribally designated housing entity in the country. Since 1961, we have developed over fifty separate housing projects for nearly 2,000 units of housing, including 1,158 low-rent units under the Housing Act of 1937 (1937 Act), and performed ongoing maintenance and rehabilitation projects.

The Reservation has a Native American population of over 19,000 while the Oglala Sioux Tribe has a membership roll of 53,572 (OST Enrollment Office 2021). The Reservation is over 3,468 square miles (larger than Delaware and Rhode Island combined) and is listed as the 3rd poorest area in America by a 2016 US Census Report. The population is spread throughout nine districts. OLHA manages 1,158 1937 Act low-rent units in addition to 108 low-rent units developed under the Native American Housing Assistance and Self Determination Act of 1996 (NAHASDA) in 19 clusters and scattered sites. OLHA also manages 218 1937 Act and 93 NAHASDA home ownership units.

OLHA worked with a partner to install solar on one RIF house in 2017 and three Tribal Housing and Urban Development houses for homeless veterans in 2017 and 2018. Oglala Omaste 2020 is a project that came from the Tribe's response to conversations and evaluations of tribal needs, energy options, local utility provider net metering policies, and available funding sources.

The Oglala Omaste 2020 project integrates into long-term energy goals of OLHA and Oglala Sioux Tribe to provide tribal members with energy savings by reducing utility bills. Installing solar PV on tribal facilities and residences promises several benefits to tenants and the surrounding community.

3.0 Project Objectives

The Oglala Omaste 2020 project is expected to save OLHA and tribal tenants over \$8,200 annually, and over \$380,000 over the 30-year lifetime of the project. In addition to clean energy generation and lower electrical utility bills, tribal members of the Oglala Sioux Tribe will benefit from workforce development provided by paid, hands-on training from the project contractor, GRID Alternatives. OLHA will increase staff capacity through acquiring experience with solar PV installation and operations and maintenance. The OLHA building is the first tribal facility to be solarized, setting the foundation for future solar transition projects at Pine Ridge.

In consideration of Pine Ridge Reservation's energy climate, Oglala Omaste 2020 has the following objectives:

- Sustainable: support tribal environmental and net-zero energy goals by reducing reliance on non-renewable energy resources, increasing local renewable generating capacity, and reducing the tribe's environmental footprint.
- Affordable: minimize life-cycle costs of energy services compared to historic costs.
- Commercial Technology: Rely on commercially available technologies with standard service warranties.
- Strategically Integrated: support the strategic goals, plans, and mission of the Oglala Sioux Tribe, including preserving and sharing cultural traditions, improving the general welfare of the tribal community, and compassionately providing for the people and future generations.
- Economic Development: economic development is of high priority for the Tribe, given the high poverty and unemployment rates on the Reservation. The Tribe expects to develop projects that can generate employment for the members as well as provide training and expertise for high-demand jobs.
- Cost-Effective: for the project to be viable, it is necessary to evaluate options based on their cost-effectiveness over a 30-year horizon.

The OLHA building is the first tribal facility on Pine Ridge Reservation to incorporate solar PV electricity production, serving as an example for future solar PV projects at Pine Ridge.

4.0 Description of Activities Performed

The Oglala Omaste 2020 project began on January 1, 2021, and was overseen by the Project Manager and OLHA, who received approval to contract with GRID Alternatives (GRID) to carry out the final design and installation. OLHA and GRID worked with the Nebraska Public Power District (NPPD), the incumbent utility servicing the project meters, on the scope of work and interconnection requirements. OLHA obtained interconnection approval from NPPD, and the solar PV equipment was ordered. GRID worked with OLHA on recruiting construction staff, students and local participants and provided mandatory orientation on solar PV basics, construction safety, and scope of work. GRID provided hands-on training on racking, wiring, and module installation as well as alternating current (AC) scope of conduit, combiner box, and inverter installation. The installation of the six roof-mounted solar PV systems was carried out between July and November of 2021 by GRID and the OLHA employees recruited for workforce development. The installation included training on solar PV systems installation and safety. Once the systems installations were complete, OLHA and GRID worked with the South Dakota state inspector to get the PV system installations approved and certified. A note of interest is that the state inspector mentioned that they will use the Oglala Omaste 2020 project as a model for other solar PV installations in South Dakota. OLHA and GRID completed assurance and quality control checks and received permission to operate from NPPD, and by the end of April 2022, the solar PV systems were online and operational. At the beginning of May 2022, remote monitoring was set up to monitor and log energy production to meet the 12 months of monitoring and verification required by the DOE. OLHA and GRID collaborated with NPPD to get monthly utility data reflecting the excess PV-produced electricity that was not used by the loads and therefore sent back to the grid. Utility bills were obtained for the project meters from 12 months before (baseline energy use) and 12 months after the project installations to analyze system performance and verify cost savings over the period of May 2022 to April 2023.



Image 1: GRID installers and OLHA trainees working on a residential solar PV system installation.



Image 2: Completing the PV panel installation on one of the homes.



Image 3: A completed residential solar PV installation.

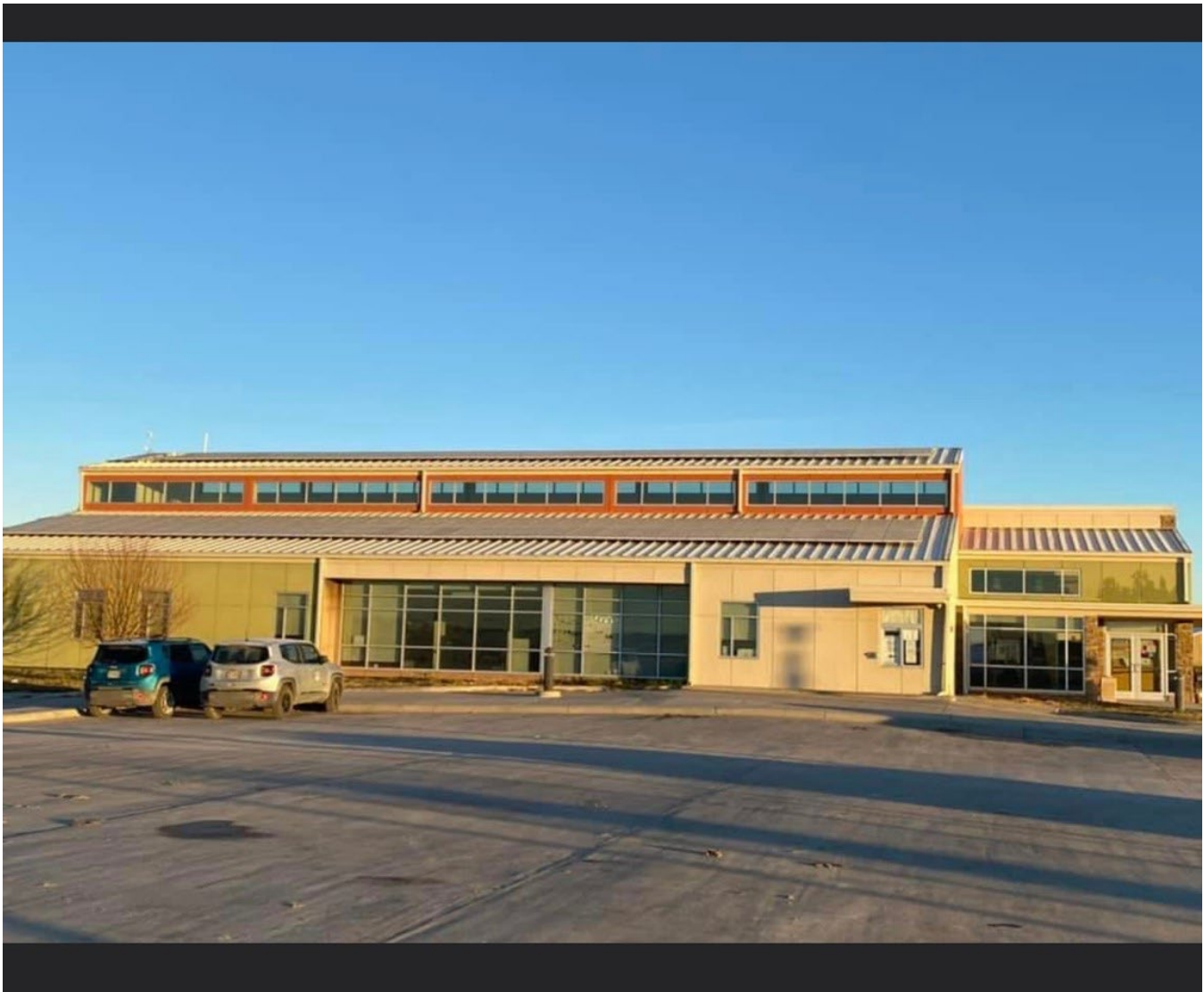


Image 4: Solar PV arrays on the roof of the OLHA administrative building.

5.0 Conclusions

Key project results include the demonstration of how solar PV systems are installed and perform on the Pine Ridge Indian Reservation. The project is providing a reduction of electricity usage, translating to energy cost savings for OLHA and residents. However, due to some remote monitoring connection issues with the PV system at the OLHA building and one of the residential systems, and one of the residential utility accounts becoming inactive during the monitoring period, monthly electricity production data is very limited for these three systems and a full understanding of the overall project performance and energy cost savings has not yet been achieved. As of the completion of this report and close-out of the DOE Office of Indian Energy grant (December 2023), the GRID construction manager has been able to re-establish the remote connections to the OLHA system and the residential system. The system inverters store only the most recent 30 days of offline production data, thereby limiting the amount of retrievable monthly data. However, the inverters store the total annual data separately,

making it possible to determine that the OLHA system alone produced nearly 47 megawatt-hours (MWh) from January 1, 2023, to December 18, 2023. This production data shows that the OLHA system and inverter has been operating as expected and has been offsetting the OLHA electric bill since the system was installed, just as the other systems without connectivity issues have been performing. Based on the monitoring data that was recorded and retrieved over the 12-month monitoring period, it is estimated that three of the five residences saved a combined total of \$2,111, and the OLHA building saved upwards of \$4,424 (one of the five residential systems was offline for 9 months, while another residential utility account has been inactive).

6.0 Lessons Learned

An initial obstacle was learning how to work with the utility, NPPD, but they were very cooperative, and the project proceeded smoothly. We did learn that, due to utility regulations and other factors, such as the relatively lower-cost of electricity, the project's return on investment is not cost effective without grant funds; however, tenants are able to save on their energy bills and reduce fossil fuel consumption, which aligns with the Tribe's long-term energy goals.

We learned that there are several new government programs and tax credits that might help with the return on investment, coverage of the initial installation costs, and lowering of utility bills even further.