FINAL REPORT TO THE DEPARTMENT OF ENERGY

RENEWABLE ENERGY AND ENERGY EFFICIENCY

Recipient Organization:	Ho-Chunk, Inc.
Project Title:	Net Metering Expansion on the Winnebago Tribe of Nebraska Reservation
Project Period:	November 1, 2018 to October 31, 2020
Date of Report:	January 27, 2021
Award Number:	DE-IE0000102
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EXECUTIVE SUMMARY:

The Winnebago Tribe of Nebraska, through their affiliated economic development entity Ho-Chunk, Inc; their affiliated non-profit Ho-Chunk Community Development Corporation; and an additional project partner Nebraska Renewable Energy Systems conducted a community scale renewable energy project on their reservation in Nebraska. Over the two-year project period, we installed PV Solar systems on ten tribally owned commercial/retail/office facilities, which included both six roof mounted and four pole mount installations. The project was undertaken as a part of the Tribe's broader initiative to increase renewable energy production on the reservation, reduce the Tribe's financial obligations for purchasing energy, and lessen our reliance upon outside sources of energy to meet our basic needs. The project enabled us to formalize and strengthen community collaborations and build our capacity to pursue additional renewable energy opportunities that will enhance our energy sovereignty.

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1. Project Overview

Acknowledgment: This material is based upon work supported by the Department of Energy, Office of Indian Energy Policy and Programs, under Award Number DE-IE0000102.

The project team consisted of the Winnebago Tribe of Nebraska, a tribal business (the grantee Ho-Chunk, Inc.); a tribal non-profit (Ho-Chunk Community Development Corporation); and a local renewable energy business, Nebraska Renewable Energy Systems.

The initiative built upon the success of a series of single-site renewable energy projects undertaken on the reservation, as well as one previous DOE funded community scale project initiated in 2017, project DE-IE0000089. Using protocols and partnerships developed for these prior projects, the team identified seven additional tribally-owned locations on the reservation to serve as sites for a community-scale renewable energy initiative to be undertaken in a compressed time period. The ten sites have a combined capacity of 280kW consisting of:

- 50kW Pony Express Fuel Station at Winnavegas Casino
- 23kW Pony Express Fuel Station in Rosalie, NE
- 8kW HCI Accounting in Winnebago
- 25kW Blackhawk Community Center in Winnebago
- 50kW at Winnavegas Casino
- 50kW at Winnavegas Hotel
- 8kW at Winnavegas North Amphitheater
- 15kW at the Winnavegas RV Park
- 25kW at the Winnavegas Training Center
- 25kW at the Health and Human Services building

2. Objectives

Key objectives of our project are to:

a. Create an expanded Community Solar infrastructure on the Winnebago Tribe of Nebraska Reservation

b. Install renewable solar capacity on ten additional structures owned by the Winnebago Tribe or their tribal entities
c. Generate 280kw or more of energy
d. Create a substantial percentage of this tribal community's total community energy
e. Incorporate commercial, tribal government, and community facility structures
f. Build upon the long term commitment that Ho-Chunk Inc. as made to include clean energy production on the Winnebago Reservation
g. Continue the growth of sustainable energy and increased carbon offset while reducing the amount of outside energy the Tribe and tribal entities must purchase from outside the reservation in order to expand tribal sovereignty

3. Description of Activities Performed

The Community Scale Solar Energy Project performed by HCI completed all SOPO items as outlined. The project was prepared and executed within the two year time period. A year of system monitoring was performed for nine of the ten sites listed in the table below. The tenth (Tribal Health & Human Services facility) was installed late in the project term, so a full year of monitoring data is not yet available but is underway, as negotiated with DOE.

Location	AC kW	DC kW	MWh	$/MWH	Value	Installed $	$/watt	Usage/yr	Match	Type
Pony Sloan	50	58	80	$116	$9,280	$121,974	$2.10	102 Mwh	HCI	Ground
Pony Rosalie	23	25	38	$110	$4,180	$81,250	$3.25	128 Mwh	HCI	Pole
HCI Accounting	7.6	8.4	12	$100	$1,200	$30,622	$3.65	80 Mwh	HCI	Pole
BHCC	25	58	40	$81	$3,605	$64,999	$2.24	543 Mwh	Tribe	Roof
Casino	50	29	80	$88	$7,040	$107,133	$1.85	5131 Mwh	Casino	S-5 Rood
Hotel	50	58	80	$94	$7,520	$105,122	$1.81	1528 Mwh	Casino	S-5 Roof
Amphitheatre N	7.6	8.4	12	$260	$3,120	$30,622	$3.65	14 Mwh	Casino	Pole
Sign/RV Park	15	16.8	24	$115	$2,760	$55,744	$3.31	61 Mwh	Casino	Pole
Training Center	25	29	40	$115	$4,600	$66,158	$2.28	106 Mwh	Casino	Ground
Human Srvs Bldg	25	29	40	$81	$3,604	$64,998	$2.24	543 Mwh	Tribe	Roof
Totals/Average	278	320	446	$116	$46,909	$728,622	$2.69	8,236 Mwh		
PAYBACK 7.20% IRR 12.6yrs @3% 15.5 simple										

Examples of the initiative's rooftop and pole-mount installations follow here:

Pony Express Rosalie

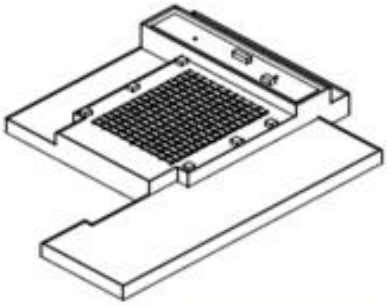
- First use of MPM mounting system
- Utilized property edge with a north/south spine
- Traffic bollards became necessary because of traffic
- Excellent production
- $3.25/watt installed cost

HCI Accounting

- Already had a skystream on this meter to make a hybrid system
- All electric building
- Pole mounts well adapted to sloped ground
- $3.65/watt installed cost

Blackhawk Community Center

- Difficult design burden
- Open area, excellent solar access
- Load analysis completed
- Attached system using power grip anchors
- $2.40/watt installed cost



100kW Winnavegas Casino + Hotel

- Standing seam metal roof, quickly deployed
- Open solar access
- $1.85/watt installed cost
- Performed roof loading study

4. Conclusions and Recommendations

Our project confirmed what preliminary results of our previous DOE-supported initiative suggested: Net metering to replace retail consumption of the end user offers the highest return on investment solar energy can offer. Monitoring of our installed sites through the end of December, 2000 documented the following savings and efficiencies:

Location	AC kW	Status	Electrical status	Savings to date
Pony Sloan	50	Installed	Completed, online	$10,100.00
Pony Rosalie	23	Installed	Completed, online	$3,420.00
HCI Accounting	7.6	Installed	Completed, online	$1,340.00
Blackhawk	25	Installed	Completed, online	$868.00
WV Casino	50	Installed	Completed, online	$11,200.00
WV Hotel	50	Installed	Completed, online	$11,120.00
WV Amph North	7.6	Installed	Completed, online	$2,400.00
WV RV Park	15	Installed	Completed, online	$3,900.00
WV Training Ctr	25	Installed	Completed, online	$5,300.00
Human Srvs Bldg	25	Installed	Completed, online	TBD*
	278	Complete	Total, 1st year	**$49,648.00**
			Annual goal	**$47,000.00**

* Cost savings to date for this site still being assessed

By combining retail offset with a number of projects together, thereby leveraging economy of scale, the result is a very cost effective project that reduces retail power bills. These smaller projects also utilized standard policy and interconnection rules, eliminating any special studies or approvals. Unfortunately, net metering is limited to 25kW and 1% of the local grid. Our recommendation is to foster more growth in this area so that projects can be installed at <$3/watt while replacing retail power. Grouped, decentralized project that can leverage container load panel purchases will provide economic return that cannot be beat, while offering project simplicity that will enable local implementation and monitoring over the long term. Project sites should all verify solar access to ensure projected power production estimations.

Across the ten sites our project installed 900 solar panels on our reservation. These panels will generate 280kw of solar power, reducing energy bills by about $40,000- $46,000 annually. These projects will offset 455 MWh at the sites annually and offset significant retail consumption for the Tribe.

5. Lessons Learned

Most of the lessons learned from this and previous tribal renewable energy projects were things we realized by digging into local energy policy, exploring (and piloting) a number of options, and moving toward the indicated solutions:

Initially we explored wind investments, but found that:

- Didn’t qualify for tax credits.
- Grants helped offset the cost.
- Commercial scale sold for ~2.9 cents KW, brought back at ~10 cents KW.
- High maintenance costs

Next we shifted to solar investments:

- Started with small projects.
- Grants helped offset the cost.
- Focus on offsetting cost of retail power.
- Low maintenance costs.
- Nebraska has very good solar resources
- Know your interconnection policy!

Regarding Planning and Engagement :

- More and better communication with all stakeholders is key
- Use technology and social media to inform members
- Don’t forget old school use of flyers and newsletters
- Always, always, always include the Tribal Council.

Tips for Mechanics and Construction

- Keep projects simple as possible
- Know interconnection policy and economics
- Keep a ‘low profile’
- Protect from traffic, if it’s possible, they’ll hit it.
- Managing contractors and budgets
- Further development of ‘rightsizing’ capability

Overall lessons learned were all positive and will be used as a foundation for more efficient future development. Project budgets were adequate and all SOPO goals were met. This was another incremental, yet significant step for growth for HCI and the Winnebago Tribe of Nebraska. We very much appreciate the support and partnership with the US Department of Energy’s Office of Indian Energy, and we are very pleased with how all the projects worked out.