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Native American Renewable Energy Approaches: Navajo Tribal Utility Authority and NativeSun

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ABSTRACT

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Native American tribes encounter many new technologies today, some of which may positively or negatively affect the lives of their people. One area where technology is growing is the renewable energy field. Depending on where a tribe is located, the tribes may have options to explore new technologies that are available. Many issues and concerns affect the decisions of tribes because the tribal leaders understand that the decisions they make today will definitely affect the future generations of their people. This paper focuses on two tribes, the Navajo Nation and the Hopi Pueblo. These tribes have taken steps toward using photovoltaic systems to provide electricity for their communities. The two businesses that have made the solar programs successful within these tribes are the Navajo Tribal Utility Authority and NativeSun. These solar programs were made possible by champions within the tribes that worked toward what they believed in. These champions are needed to sustain the programs so that they may continue to be successful in assisting the needs of the tribal members.

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As we move into the 21st century, technology continues to grow and Native American tribes strive to make transitions to better the lives of their people through available renewable energy technology. Each tribe is faced with decisions concerning the present day, but most importantly concerning their future generations. The tribal communities are trying to figure out which technology is best for their people. Many options are available for some tribes, depending on the location of the reservation. For example, some Southwest tribes can take advantage of solar power to electrify their communities. Solar energy technologies represent a great beginning for many tribes, especially for the people who live in the rural areas. Two tribes who have taken advantage of solar power are the Navajo Nation and Hopi Pueblo both located in the Southwest. The idea of using solar energy to create electricity began with two organizations within the tribes. The Navajo people have the Navajo Tribal Utility Authority (NTUA) at their side and the Hopi people have the grass-roots organization, NativeSun, to provide for their needs. Both organizations encompass different methods in managing their solar programs but have the same intent for their people: to better the lives of the people using their expertise in the electrical generation field.

The data applied in this paper was acquired through various research methods. Literature reviews from Sandia National Laboratories as well as other renewable energy brochures and articles were helpful in offering useful knowledge. Attending solar energy conferences such as the American Solar Energy Society Conference and the Southwest Renewable Energy Conference were beneficial as well. However, the one-on-one interaction with the NTUA and NativeSun personnel was most rewarding. This

interaction with the employees created wonderful opportunities for interviews where useful insight was acquired. A great deal of information was also obtained orally through informal conversations and interviews.

NTUA began its utility with a particular goal in mind, and that is to serve the Navajo people with their utility needs. Its mission states:

> To provide electric, natural gas, water, wastewater treatment and related services at competitive prices, while contributing to the economy of the Navajo Nation, consistent with the improvement of the health and wealth of the residents of the Navajo Nation, and the employment of the Navajo people [1].

NTUA's main focus was originally on line extension, but many Navajo families cannot afford to extend the grid for $25,000 per mile [2]. Instead of just performing line extensions, NTUA decided to create a program that provides qualified Navajo families with stand-alone photovoltaic (PV) systems. NTUA currently offers a 640-watt system on a 15-year lease-to-purchase agreement and an 880-watt system that includes a wind turbine. Customers pay $95 monthly for the lease payment and maintenance of the 640-watt system and $75 for the lease and maintenance of the 880-watt system [2].

NativeSun began as a nonprofit organization and recently became a for-profit business. Its mission is "to become a self supporting enterprise in establishing sustainable, culturally appropriate energy and economic systems [3]." The way NativeSun performs its business is by selling PV systems to its customers so that they have that ownership. The important business aspect that NativeSun performs is that they provide the products that their customers can afford. NativeSun created a revolving loan

[1] Navajo Tribal Utility Authority website. http://www.ntua.com/. 2003.
[2] Navajo Tribal Utility Authority, *Navajo Electrification Demonstration Program*, Navajo Tribal Utility Authority, Navajo Nation, May 2001.
[3] NativeSun, *Native Sun, Providing Solar Electricity from Native Americans.*

program in consideration of the financial hardships that some of the Hopi tribal members face. This loan program had a 12% interest rate for five years and the elders have an 8% interest rate [4]. Most people could pay off their systems within this time period with few problems. Before NativeSun sells a PV system to a customer, representatives explain how the system works along with the capabilities it has to offer. The NativeSun office is a demonstration of how solar power works and is used to educate the customers. Once a customer decides to purchase a system, NativeSun tries to educate the customer in system maintenance. The grass-roots organization is available to assist customers if needed, but charges for maintenance.

Understanding PV systems on tribal lands requires knowledge of the word *rural*, which has a different meaning when used to describe the land on a reservation. People do not realize what a rural setting is like until they actually drive to the Navajo and Hopi people's homes. The area is very dry, hot, and desolate. Hardly any modern conveniences are available. Some households lack both electricity and running water. Living this type of lifestyle can teach a person to conserve, which is perfect for the people who use the PV systems. Conservation analogies are helpful when trying to explain the proper load use to the people who use the PV systems. Since many tribal members do not have running water and they have to haul their own water to their homes, one analogy used has to do with a barrel of water. Energy is required to fill the barrel of water and to haul it to the house, just as it takes energy to power a battery from the sun. A person wants to conserve this barrel of water to have enough for all the chores that must be performed as well as for consumption. The same mentality can be used when

[4] LaDuke, Winona. *All Our Relations, Native Struggles for Land and Life*. Cambridge: South End Press, 1999.

running the different loads from a battery. It would not be wise to leave a TV or a light on if no one is using it, because the battery contains only a certain amount of energy. Analogies like this are useful because they help people understand a PV system, especially when it is new to them.

In general, education about PV systems and solar energy concepts is important for the tribal members so that they can realize how clean and useful this energy can be. Both NTUA and NativeSun try their best to educate their customers about the PV systems. NTUA, with assistance from Sandia National Laboratories, created a video for their customers that broadly explain to the people how the PV systems work. It also explains the proper load use for costumers to follow so that they keep their batteries charged at a safe level. The video was made both in English and in the Navajo language so everyone can benefit from it. Some customers only speak their native tongue, so they are further challenged to learn about the PV systems when words are not translated for them. Employees from NTUA and NativeSun are very gifted to know both English and their native languages because they can translate and explain to their customers in a way that helps them better understand the systems. Personnel who know the tribal language can bring comfort to the customer, which in return creates a trusting relationship between the electrician and the customer. Creating a strong customer bond is very important for businesses like NTUA and NativeSun, because tribal members may become more open and willing to learn about new technology.

Strong, trusting relationships must be created when dealing with tribes because they are very protective of their people as well their land. An outsider cannot walk into a village and try to convince tribal members to buy a product. Sometimes even a Native

American, working for the government, cannot come into a village to perform a job and be freely accepted by the tribal members. A person must respect the people and their village and prove trustworthiness. As outsiders continue to visit and show the tribal members that they are there to provide assistance, they then become accepted slowly. Before visits are made to homes on Navajo land as well as Hopi, the electricians must first ask for permission to visit the site. If the customer grants that permission, the electricians can then show up on-site and work on the PV systems. Taking photos is also a very sensitive issue on tribal lands. Some people prefer not to have any photos taken of their houses as well as their PV systems. Electricians must ask for permission to take any type of photos in the villages and the homes. The tribes take great precautions because they are very serious in protecting their culture, which is their way of life.

It is easy for many people to ask, "Why would people want to use solar energy and limit themselves when they could have endless use of electricity if they were connected to the electrical grid?" The Navajo Nation has different reasons for using solar energy. The people do not have a central living area where everyone's homes are clustered like a Pueblo. Instead, many families live in rural areas scattered throughout their 17 million acres of reservation land. This land spreads across three states: New Mexico, Arizona, and Utah. As mentioned previously, these families living on the remote lands cannot afford to pay for line extensions to their individual households. In consideration of the financial struggles, the next best way for the families to receive electricity would be through PV systems. There are some cases where Navajo families have no choice but to use the PV units for electricity, because it is likely that the grid will never be extended to their area. It would not be economically feasible to have the grid

extended many miles into the desert or mountainous terrain for one household to receive electricity. However, everyone in the United States should have access to electricity, if they choose to. Many Navajo people need electricity for lighting so they can perform their household chores and so the children can attend to their academic studies.

The Hopi people have various reasons why they choose to use solar power as well. Many of the people do not want grid extensions to their villages because they would like to keep the aesthetics of their traditional homes. The people strongly feel that it is important to preserve their traditional houses as well as their culture. Bringing tall electric poles into a village would destroy its natural and traditional look. One out of thirteen villages in Hopi even decided to bury their power lines underground instead of running them above the ground, just so that they can keep the aesthetics of the village. Another reason why line extension is not favored in some villages is that a certain area of land must be designated so the electric poles can be installed. The people of Hopi prefer not to have outsiders freely come into their villages to perform work on the grid. Having a grid brought into their villages would give the right of way to the electric company onto Hopi land. The other reason why people choose to use solar power is that it is a clean, quiet, and independent way to generate electricity. Before PV systems were introduced to the Hopi villages, the people used generators to generate their electricity. The villages of Hopi are very compact, therefore causing a great disturbance throughout the whole village when generators are running. Just as the Navajo people need simple lighting, so do the people of Hopi. Many of the children need lighting for their schoolwork and others need the lighting to perform their arts and crafts. Even though it would be easier

to extend a grid into a Hopi village than to extend one on Navajo land, some Hopi people continue to refuse the opportunity.

Most of the people support the PV systems and enjoy having them. There are also people who dislike the idea of flashy solar panels sitting on rooftops. A handful of people actually refuse to electrify their homes for various reasons. Most of these people who refuse electricity were raised without it and think that they have no use for it. Others are afraid to try new things, especially when using structures that seem a bit overwhelming to maintain. It takes time for people to go through changes in the tribal communities because many people think that they are not necessary. Changes occur slowly in any community and that is true in many tribal communities as well. Sometimes it is difficult for outsiders to realize why some tribal members refuse to take advantage of electrification. It is imperative to remember that the people themselves know what is best for them and their homes.

These solar programs would not be possible if it weren't for a few champions that keep striving to create opportunities for their people. Mr. Larry Ahasteen, NTUA's Renewable Energy Specialist, is one of the champions of NTUA's solar program. One of his goals has been to implement the idea that PV systems are a wonderful way to go about providing electricity for the Navajo homes located in rural areas. Deborah Tewa, a former NativeSun electrician, is the champion for this organization. She is currently a student at Northern Arizona University and a year-round student intern at Sandia National Laboratories. Both individuals have made an enormous impact in their solar programs. They have made the solar programs possible for their organizations but most importantly for their people. It takes individuals like these to make a new program

prosperous and successful. When a new program is started within a tribe, it is essential for people to teach one another the way the system works so that the program can continue to grow. If people lose interest or lack the knowledge of a system, the program as well as the PV systems will eventually go to waste. Many programs on the reservations are discontinued because of these types of situation. In order to sustain a PV system as well as the program, there must be that one person or group of people that stay determined and spread their knowledge to others.

Tribes are currently experiencing growing pains as they try to adapt to the new technologies being exposed to them. The U.S. government took its time to grow as a nation and that's what the tribes need in order to gain the proper knowledge that will benefit their people. They want to make certain that they are protecting their people as well as their land with whatever decisions they make. Every decision made today will have an effect on the tribe later down the road. Not only must the tribes think about situations from a westernized point of view, but they must also consider their cultural thoughts and concerns. Every tribe wants their children, culture, and traditions to prosper. The use of solar energy is still new to many tribes as well as to many people in the United States. Many tribes are open to suggestions, but are not looking to be told what to do. Help from the technical facilities such as Sandia National Laboratories is appreciated, just as long as good relationships are formed and kept strong.

Being a Native American in the science field is a very interesting position to have. Working for the government and at the same time trying to assist tribes was a great experience. Both sides of the playing field and many issues that both sides encounter were observed. It is important to have Native Americans in these types of positions so

that they can serve as the buffer, or the bridge, between the two groups. They can explain the tribe's points of view to the technical side and the technical points of view to the tribes. This may become essential in creating good working relationships between the two groups. Good relationships are essential for the tribes because they are knowledgeable of the dangers that they have faced in the past concerning their people and land.

I would like to end the paper with a final thought from Mr. Ahasteen. On our field visit to the Navajo land, he mentioned that people refer to renewable energy as *free* energy. However, Native Americans believe that the sun, wind, and geothermal waters are all gifts from the Creator. As people use these resources today, they should always remember to give thanks for all that is provided. Nothing is essentially free from this land.

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