



Tribal Lands Renewable Energy Program



Small Scale Renewable Energy for Tribal Families and Communities





Many of today's renewable energy projects are large scale and cost millions of dollars

They are an important and integral part of a new tribal sustainable energy use strategy





But relatively low-cost, small scale renewable energy approaches are becoming more attractive

- **Much faster to develop**
- **Build local employment and skills**
 - **Increase employment and**
- **Can save families *and* tribes a *lot* of money**

All while lowering pollution and fighting global climate change



Some renewable energy applications like *solar electric* and *wind turbines* are dropping in price but are not *yet* cost-effective at the family and community scale

Other applications like *solar air heaters* are *already* extremely cost effective and should be a part of *every* tribe's energy use strategy



Tribal Lands Renewable Energy Project

Using the power of nature for Native Americans

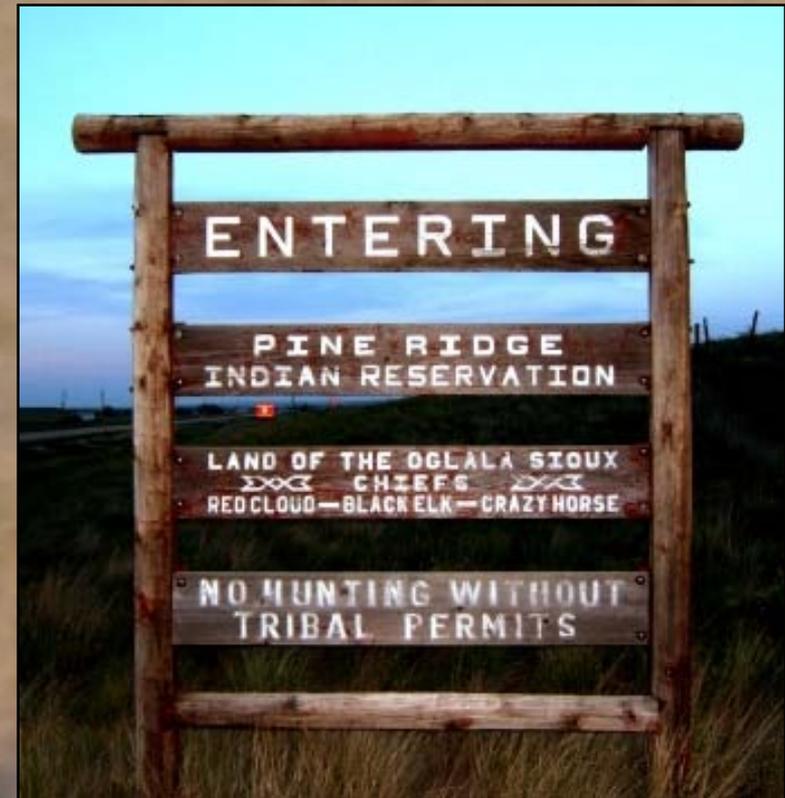
The Tribal Lands program began on the Pine Ridge reservation in South Dakota in 2002. Its goals are to:

- Reduce high energy bills for reservation families
- Improve living conditions, especially for elders and children
- Build renewable energy skills in Native American communities
 - Develop employment opportunities

The Harsh Facts of Life on Pine Ridge and many other reservations



- Lowest per capita income in the US
- Utility bills often exceed \$400 per month
 - 85% + unemployment
- Lowest life expectancy in the United States
- 90% live below Federal poverty level





About 60% of Lakota at Pine Ridge live in poorly made trailer homes...



...that are heavily impacted by the extreme natural forces there

The elderly often live under difficult conditions and struggle to survive the bitter winters



To counter the north wind that sometimes causes ice to form inside Lakota homes...



Trees, Water & People has planted windbreak and shade trees for more than 130 families

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In 2003, to provide *more* heat at *less* cost,
we began to also install supplemental
solar air heating systems



A
supplemental
solar heater
saves an
average of
about \$100 *per*
month during
winter

Supplemental Solar Heaters



- A solar heat system consists of collector + fan + controls
- One 4' x 8' collector can provide 10-30% of heat for a well-sealed home
- Weatherization can save up to an additional 18-30%
- Solar heater + weatherization can cut heating bills *in half*

Lakota Solar Enterprises

Proprietor: Henry Red Cloud



- In business since 2005
- Located in Oglala, SD on the Pine Ridge reservation
 - Assembles & installs solar heating systems and other renewable energy applications
 - Community-based enterprise
 - Keeps money in the community
 - Provides employment & job training

Tribal Lands Renewable Energy Project

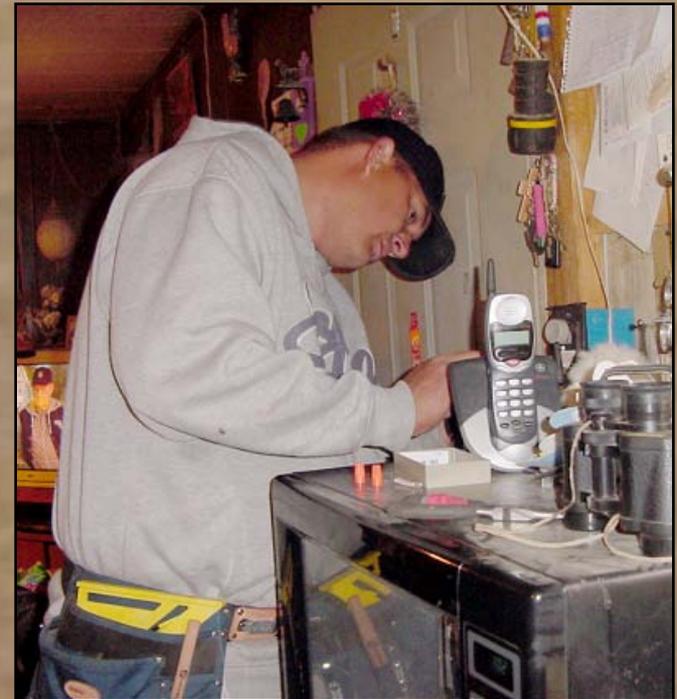


Accomplishments of the partnership of Lakota Solar Enterprises and Trees, Water & People

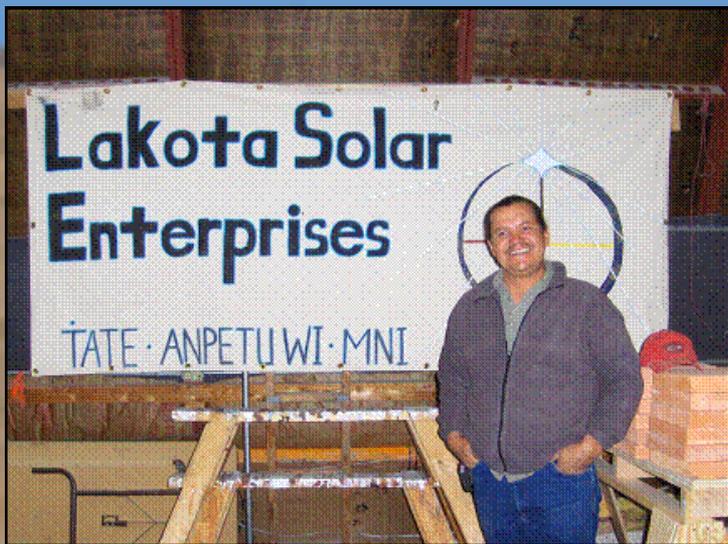
- Raised the funds & installed over 200 solar heat systems for Lakota families
- Planted family windbreaks for more than 130 additional Lakota families
- Installed a solar electric system, wind turbine, solar heat system and planted windbreak and shade trees as part of Rosebud's *Clean Energy Education Partnership*
- Conducted 28 community and tribal government tree planting and renewable energy workshops across the Great Plains



Solar Heaters Bring Economic Development



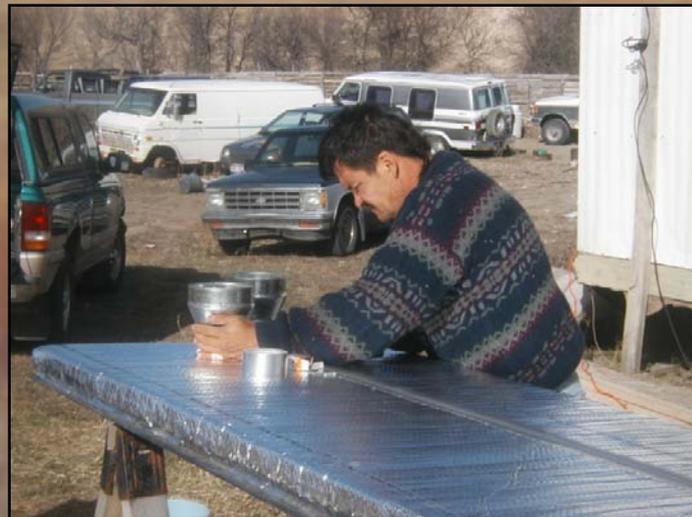
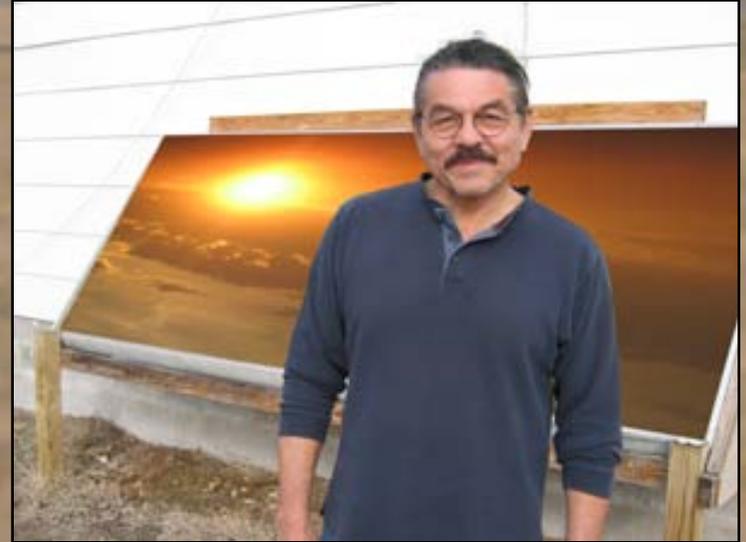
Lakota Solar Enterprises provides employment and job training for our youth



Houses are warmer and more livable, especially for the elders and children



Families save 20-30% on winter utility bills for 20-30 years with almost no maintenance!



Often tribes help pay their member's utility bills so *both* the family *and* the tribe benefit from more heat and lower heat bills



- Supplemental heat costs pennies a day
- Average savings \$100 *per month* for 4+ months every winter
 - Cost: \$1,200 installed
 - Pays for itself in about 3 years
 - Savings continue for another 20+ years

Supplemental Solar Heaters



- **After a 2-year research and design process, TWP has developed an improved solar air panel that is more efficient and produces considerably more heat**
- **LSE has been trained to build these solar panels and they will be built on Pine Ridge and available to other tribes**
- **Solar heaters only have one moving part – that can be replaced at most hardware stores**

In total, families on *ten* reservations in seven Great Plains states were warmed this winter by our solar heating systems.



MANDAN, HIDATSA & ARIKARA



In addition to Pine Ridge and Rosebud in South Dakota, we have installed demonstration solar heating systems for:



- **Standing Rock, North Dakota**
- **Northern Cheyenne, Montana**
 - **Wind River, Wyoming**
 - **White Earth, Minnesota**
- **Fort Berthold, North Dakota**
- **United Tribes Technical College, Bismarck, N.D.**
 - **Cherokee Nation, Oklahoma**
 - **Skull Valley, Utah**

Installations help *real* people like this one for Bessie Silk on the Standing Rock Reservation



And this one for Margene Bullcreek in Skull Valley, Utah





**We also had the honor of working on
a major small scale renewable
energy demonstration project with
the Rosebud Tribe in South Dakota**

***The Clean Energy Education
Partnership (CEEP)***

Clean Energy Education Partnership (CEEP)



The CEEP partnership was initiated by the Rosebud Utility Commission (TUC).

Partners included

- **Council of Energy Resource Tribes (CERT)**
 - **Sicangu Wicoti Awanyakape (SWA)**
- **National Renewable Energy Laboratory (NREL)**
 - **Lakota Solar Enterprises (LSE)**
 - **Trees, Water & People (TWP)**

Clean Energy Education Partnership (CEEP)



LSE and TWP coordinated the *Little Thunder Project*

Project consisted of a series of hands-on workshops integrated into the installation of four renewable energy applications on the Little Thunder home

- Windbreak and shade trees
 - A 1.8K wind turbine
 - Solar air heating system
- A 1.3K solarphotovoltaic system



The Little Thunder Project

Utilized *two* types of solar energy

- A *photovoltaic* (PV) system that is *grid-connected* and allowed excess electricity to be sold back to the utility company
- A *solar air* heating system that provides heat for just pennies a day anytime the sun is shining

Different types of solar panels produce different forms of energy

- **Solar *Thermal***
 - An actively controlled mechanical system that converts sunlight to *heat*

- **Solar *Electric***
 - A solid state process that converts sunlight directly to *electricity*



Differently constructed solar thermal panels produce different results



Solar **WATER** Heating



Solar **AIR** Heating

HARNESSING THE
POWER



Solar electric can be mounted in a variety of ways

PV Array on Roof



PV Array on Pole Mount

HARNESSING THE
POWER



Clean Energy Education Partnership

Little Thunder Demonstration Project



**Hands-on workshops during installation process
builds local skills and capacity**

LSE and TWP worked with Rosebud's Utility and Housing Departments to install a Wind Turbine



- **Skystreamer 3.7**
- **Self-contained**
- **1.8 kW on a 63' tower**
- **Works even in low winds**
- **Costs \$10,000 - \$12,000 installed**



Electricity from Wind Turbines



- **Good choice for facilities (tribal offices, schools, community buildings)**
- **Can be either grid-connected or use batteries for electric storage**
- **Excess electricity can often be sold back to utility company on grid connected applications**



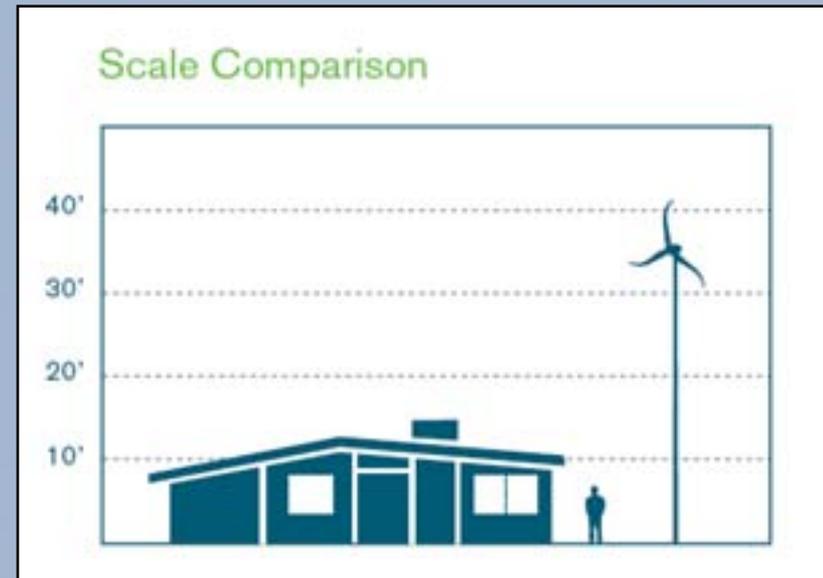


Little Thunder installation was a hands-on workshop that built capacity while lowering utility costs

Wind: Electricity from Wind Turbines



- New models are built for smaller lots and don't require a crane for installation.
- With prices declining and reliability climbing, wind turbines will likely become economically practical for family clusters, schools and government buildings in the next few years.



Little Thunder Clean Energy Education Partnership



**Solar heater, solar electric,
wind turbine, and windbreak
and shade trees**

Economics of Solar Energy



- **Solar Electric**
 - **1300 watt system (Little Thunder)**
 - **Costs \$12,000 installed TODAY**
 - **Provides 2000 kWh per year**
 - **Electricity costs \$0.085/kWh TODAY**
 - **Assuming rates increase an average of 5% per year**
 - **System pays for itself in 33 years**
 - **Not yet cost effective, but technology continues to advance and prices continue to drop**

Economics of Solar Energy



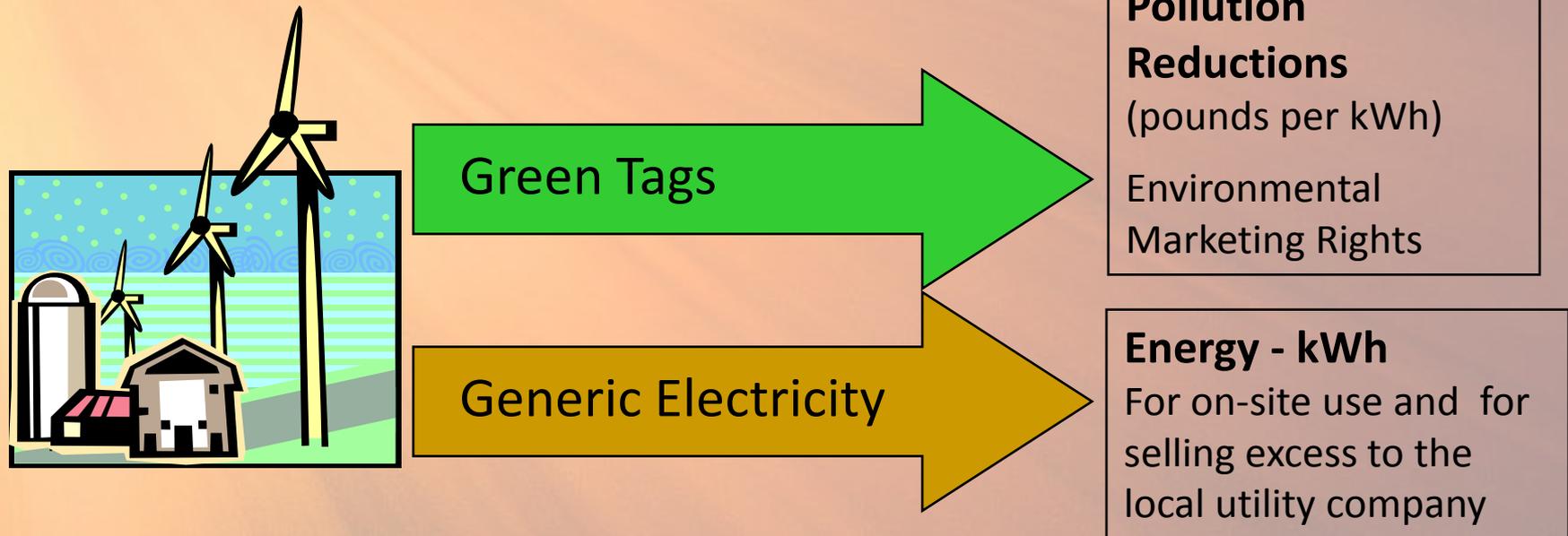
- **Solar Thermal – air heating**
 - **4' x 8' system (Little Thunder)**
 - **Costs \$1,200 installed TODAY**
 - **Provides 1700 kWh per year**
 - **Electricity costs \$0.085/kWh TODAY**
 - **Assuming rates increase an average of 5% per year**
 - **System pays for itself in less than 4 years**
 - **Easy to install and very cost effective *right now***

Economics of Solar Energy



- Energy costs continue to rise and all expectations are that they will rise *far more* than 5% a year
- Using *renewable energy* opens up the possibility of *new* income streams that further reduce the cost
- These include probable new rebates and tax credits that are likely to be passed into legislation in the next few years

Renewable energy decreases propane and oil use, reduces utility bills and can provide *new* income sources



GREEN TAGS – Many new markets are developing based on selling the environmental benefits of renewable energy such as pollution reductions and carbon credits (aka “renewable energy credits” or “green certificates”)

To facilitate increased renewable energy training by other Great Plain tribes



**LSE and TWP have created the
*Red Cloud Renewable Energy Center (RCREC)***



Two bedrooms, a kitchen and bathroom are being added this year to accommodate other tribes coming for renewable energy training

A straw bale office, greenhouse and garden, solar heater, wind turbine, sweat lodge and part of the Red Cloud buffalo herd...



Are all part of the Red Cloud Renewable Energy Center's approach to teaching sustainability

Using renewable energy and embracing sustainable living is a *new way to honor the old ways*



Take Home Points

Working Toward a Better Energy Future



- Be economically smart: *Solar air heaters* cost \$1,200 and are paid back in 3-4 years ... with a 20-30 year lifespan
- Be prepared: Solar PV & wind technology will *soon* make economic sense for community buildings and family clusters.
- Get small scale renewable energy training now to lower future utility bills for tribal families and governments.
 - Become familiar with growing sources of *new* energy income like pollution and carbon credits and net metering
 - Develop renewable energy programs that fit with traditional tribal values, create jobs and engage the maximum number of tribal members

Let us move forward and provide a better life for our elderly and new hope for our children and the generations to come



Amidst the difficult conditions, renewable energy provides hope...



Hope that life *can...* and *will* improve

Mitakuye oyasin: We are all related



Mitakuye oyasin: We are all related

