



# 2008 INTYERNATIONAL WIND-DIESEL WORKSHOP

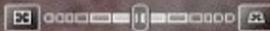
April 25 Girdwood, AK

## **NATIVE RENEWABLES: EMERGING MARKETS/SYSTEMS UNDER DEVELOPMENT**

**NATIVEWIND**  
ENERGY INDEPENDENCE  
INTERTRIBAL COUP

Bob Gough, Intertribal COUP  
[WWW.NATIVEWIND.ORG](http://WWW.NATIVEWIND.ORG)





**“LITTLE SOLDIER”-- the first 100% tribally owned, utility scale wind turbine casts a long shadow across Indian Country.**

© 2008 Google

Pointer 43°00'10.78" N 105°34'42.46" W elev 2769 ft

Streaming ||||| 100%

Eye alt 3224 ft

# REZ INTENSIVE CARE UNIT



© 2008 IntertribalCOUP.org

**Our Housing Stock is on Life Support**

Inspired by Randy Udall, CORE; Realization by Bob Gough

# CLIMATE, HOUSING AND ENERGY IN ALASKA



A Shishmaref house undermined by coastal erosion.



Several coastal villages are now actively trying to figure out where to move entire communities. (Image: Alaska Native Science Commission)



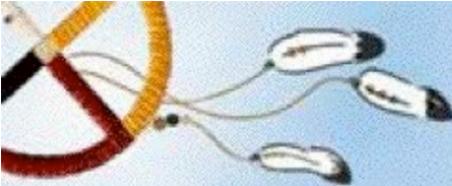
A home in Fairbanks, Alaska seriously damaged by melting permafrost.

# Tribal Energy Development from the 19th to 21st Century

For Centuries on the Great Plains  
Native Peoples Transformed  
The Gifts of the Buffalo  
Into Homes and a  
Way of Life ...



Today, Tribes  
Look to Affordable  
And Efficient Homes of Local,  
Natural Materials and to Renewable Energy  
As a Sustainable Path for the Generations to Come



# *Native Wind* Powering America

[WWW.ENERGYINDEPENDENCEDAY.ORG](http://WWW.ENERGYINDEPENDENCEDAY.ORG)



FEMA Trailer Park, Oglala, Pine Ridge

© Intertribal CCVP.org

# Cultural Traditions of Owner-Constructed Housing of Natural Materials



## Traditional Lakota Buffalo Hide Tipi

15 to 20 new buffalo hides  
required every two years



## Conventional Post and Beam Straw Bale House



Rosebud's 750 kW Turbine produces 2.4 Mil kWh/yr.  
IntertribalCOUP.org



Ft. Berthold's 65 kW Turbine installed Sept 30, 2005  
IntertribalCOUP.org

# The Great Plains

Intertribal COUP member Tribes:

- Cheyenne River
- Flandreau-Santee Sioux
- Ft. Berthold (Mandan, Hidatsa, Arikara)
- Fort Totten (Spirit Lake)
- Lower Brule
- Northern Arapaho
- Oglala Sioux
- Omaha
- Rosebud Sioux
- Sisseton-Wahpeton
- Standing Rock
- Yankton Sioux

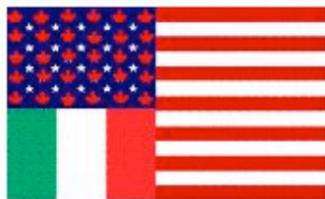


## Exposure

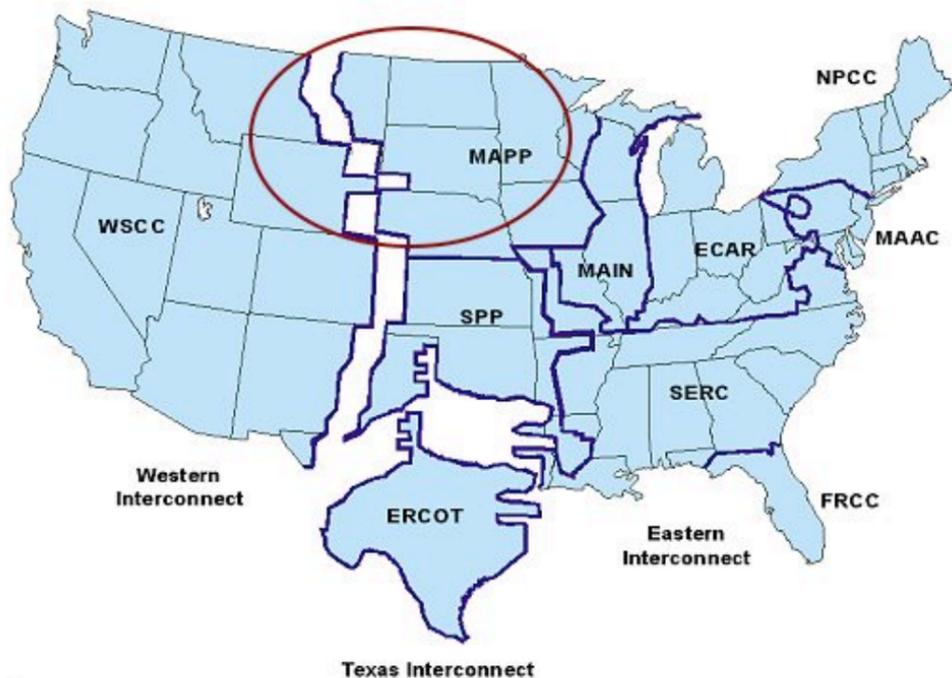
Extreme	Over 60" Ventilated <sup>1</sup> Rain Screen
High	40" - 60" Rain Screen/Vented <sup>2</sup> Cladding/Vented Drainage Space
Moderate	20" - 40" Drainage Plane/Drainage Space
Low	Under 20" Face Seal

<sup>1</sup> Ventilated means insect-protected air holes in the top and bottom of the cladding assembly, creating the potential for directional air flow in the air space behind the cladding.

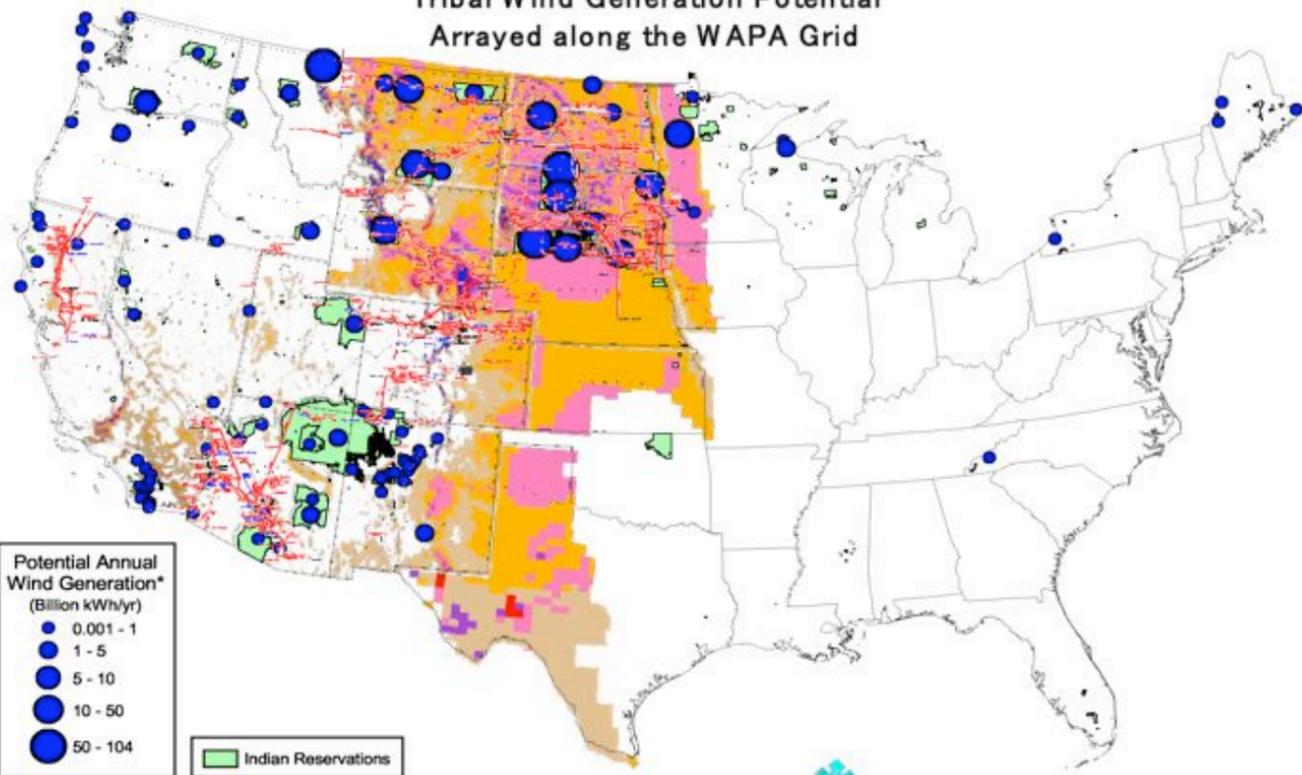
<sup>2</sup> Vented means insect-protected holes in the cladding assembly not located at the top and bottom, so that while limited air exchange in the air space is possible, air flow is not.



# The North America Grid



## Tribal Wind Generation Potential Arrayed along the WAPA Grid



\* Generation estimated for areas of class  $\geq 4$  annual average wind resource, assuming 5 MW/km<sup>2</sup> of installed capacity, and capacity factors ranging from 25.1% (class 4) to 41.4% (class 7).

Aggregate technical estimate of 209 GW does not account for sacred sites, transmission access, water bodies, or other factors that will significantly impact development potential.

U.S. Department of Energy  
National Renewable Energy Laboratory



# Regional Integrated Resource Plan for Native Wind into WAPA Hydropower

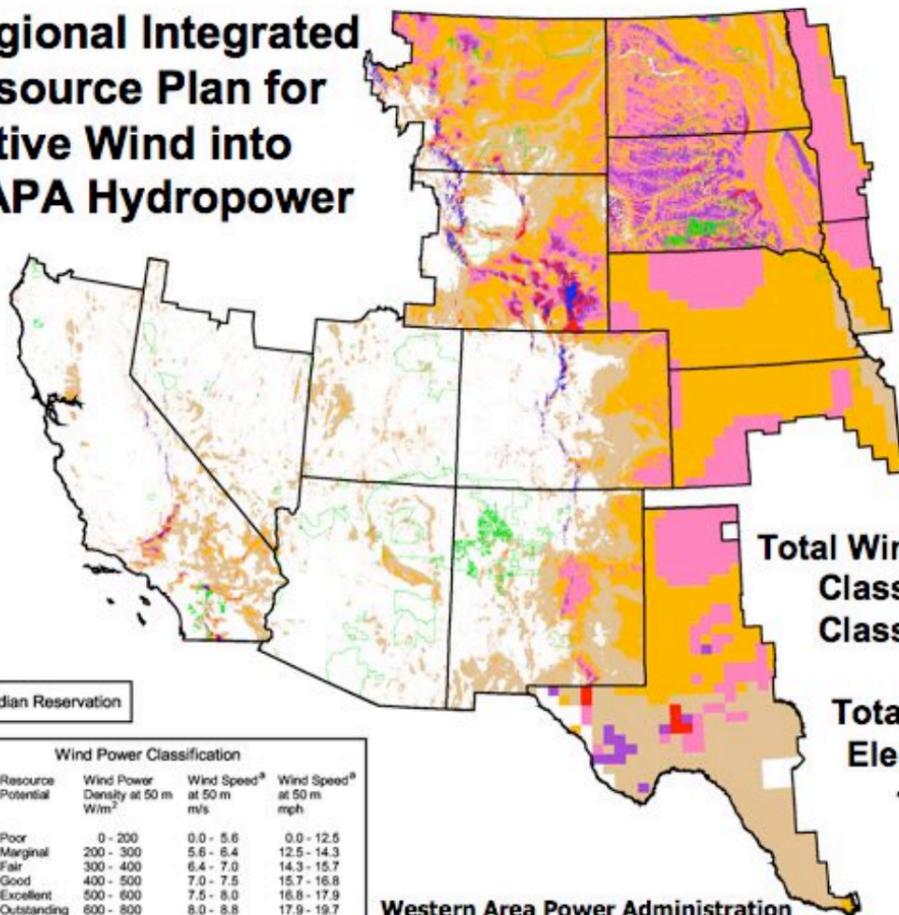
Nine of the Top Ten Wind States in the U.S. are located in the WAPA Service Territory

WAPA's total hydro-power capacity is 17,474 MWs with 2,791 MWs UGPR

Total Wind Power Potential:  
Class 3+ 4,500 GWs  
Class 4+ 2,000 GWs

Total U.S. Installed Electric Capacity  
~ 800 GWs

U.S. Department of Energy  
National Renewable Energy Laboratory



Indian Reservation

## Wind Power Classification

Wind Power Class	Resource Potential	Wind Power Density at 50 m W/m <sup>2</sup>	Wind Speed <sup>a</sup> at 50 m m/s	Wind Speed <sup>a</sup> at 50 m mph
1	Poor	0 - 200	0.0 - 5.6	0.0 - 12.5
2	Marginal	200 - 300	5.6 - 6.4	12.5 - 14.3
3	Fair	300 - 400	6.4 - 7.0	14.3 - 15.7
4	Good	400 - 500	7.0 - 7.5	15.7 - 16.8
5	Excellent	500 - 600	7.5 - 8.0	16.8 - 17.9
6	Outstanding	600 - 800	8.0 - 8.8	17.9 - 19.7

<sup>a</sup>Wind speeds are based on a Weibull k value of 2.0

Western Area Power Administration  
Wind Power Potential

# Restoring and Recharging "The Federal Renewable Energy Grid"



*Serving the West  
with Federal Hydropower*

## *... And Tribal Renewable Energy*

- Cities & Tribes are on WAPA grid as eligible WAPA "Preference Customers"
- Federal trust responsibility to Tribes
- Sustainable Homeland Economies
- Great Wind/Hydro Dynamo Potential
- Diminishing Hydropower Resource
- Clean Air Quality and Attainment
- The grid, once 100% renewable, is now only 20% hydropower and 80% coal
- Federal Renewable Energy Grid 20% hydro & 30% wind / 50% coal-gas



[www.NativeWind.org](http://www.NativeWind.org)



## An interview with Western Area Power Administration (WAPA) Administrator Tim Meeks



WAPA Administrator Tim Meeks

As hydropower resources remain static or even decrease, and with the demand for electricity continuing to grow throughout Western's territory, how do you envision tribal entities helping alleviate this situation?

Today, tribes stand on the edge of a new era of economic development, with access to a range of resources, including energy development. Biomass and wind are two important tools in the renewable energy toolbox.

The *Wind/Hydro Feasibility Study* authorized in EPAct 2005, Section 2606, is one attempt to evaluate ways to blend resources. The study will examine the feasibility of using wind power from tribal projects to supply firming power to Western. Western will work with tribes within our Upper Great Plains Region to study potential wind projects that could be developed on tribal land. Energy would be sold to Western to help meet our firm power commitments.

The goal of the study is to evaluate several projects in order to present a range of projects to Congress, some where project development would be easier (closer to transmission) and others where development would be more

challenging (e.g., out of Western's control area or far from transmission.) The Blackfeet, Fort Peck, and Santee Sioux tribes, as well as Intertribal COUP, each have provided a tribal engineer to participate on the study team. We expect to complete the study and make recommendations to Congress in 2008.

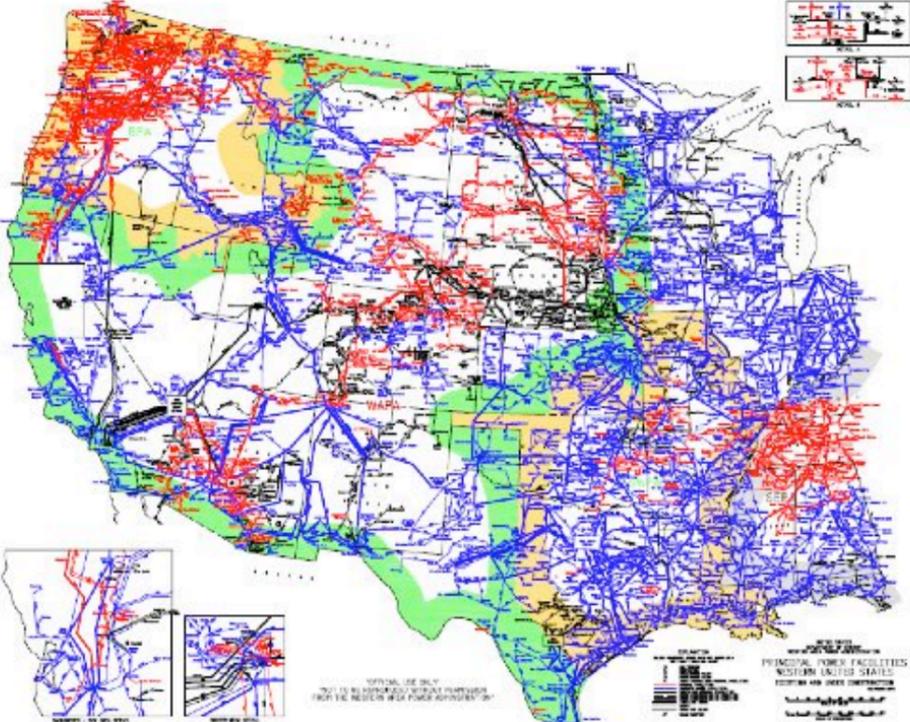
Other opportunities for tribes include making their Federal power allocations go further by adopting cost-effective energy efficiency measures identified in tribal Integrated Resource Plans and developing other energy projects on their reservations to meet regional demand, promoting tribal economics and energy self-sufficiency.



Patrick Spears (left) and Robert Gough (right) of Intertribal COUP receive the Award for Courage at the World Clean Energy Awards in Basel, Switzerland.

**Intertribal COUP (Council on Utility  
Policy) Environmental Justice Wind  
Project Wins World Clean Energy Award**

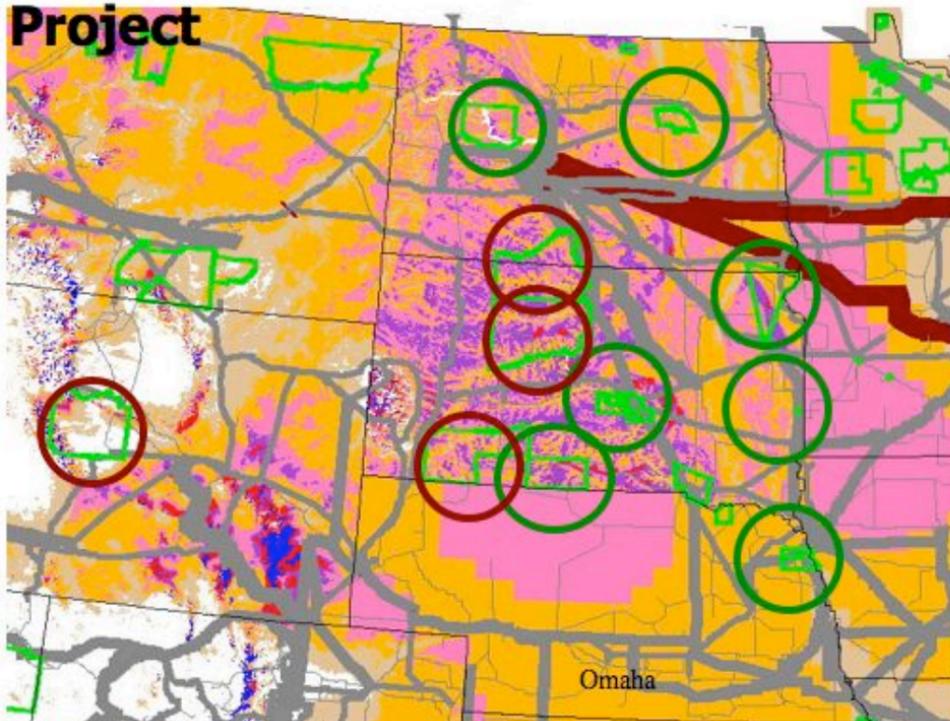
# Principal Power Transmission Facilities





# Intertribal COUP Wind Demonstration

## Project



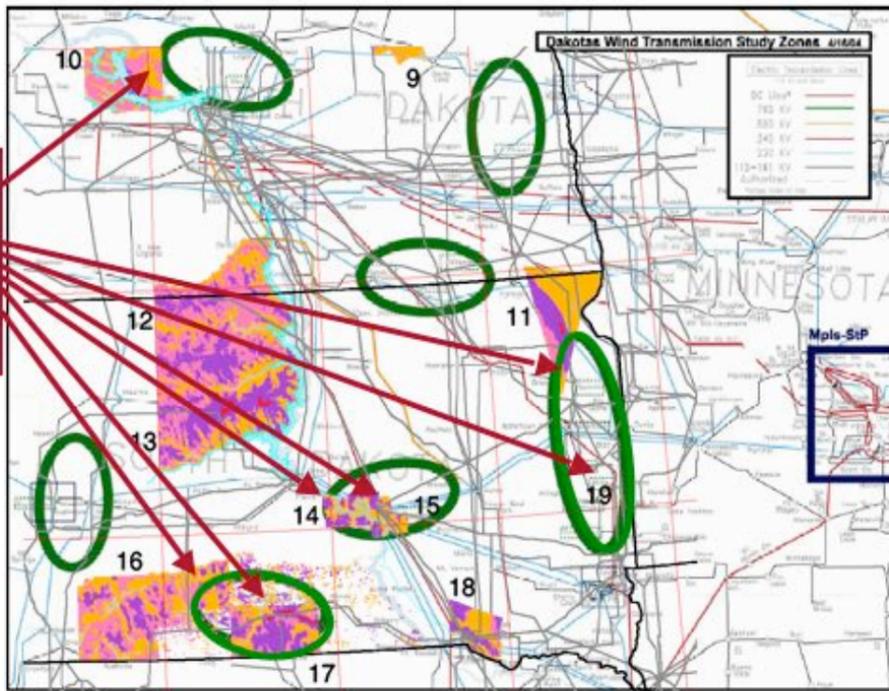
COUP Tribes have, by Resolution, signed on to participate in the Intertribal 80 MW wind development demonstration project, with several more pending.

This tribally-owned, multi-MW intertribal project is to be built in 10 MW clusters on each of the participating COUP Reservations.

-  Planned
-  Pending

# WAPA / WIND INTEGRATION STUDY AREA

## Includes Several Reservation Interconnection Sites

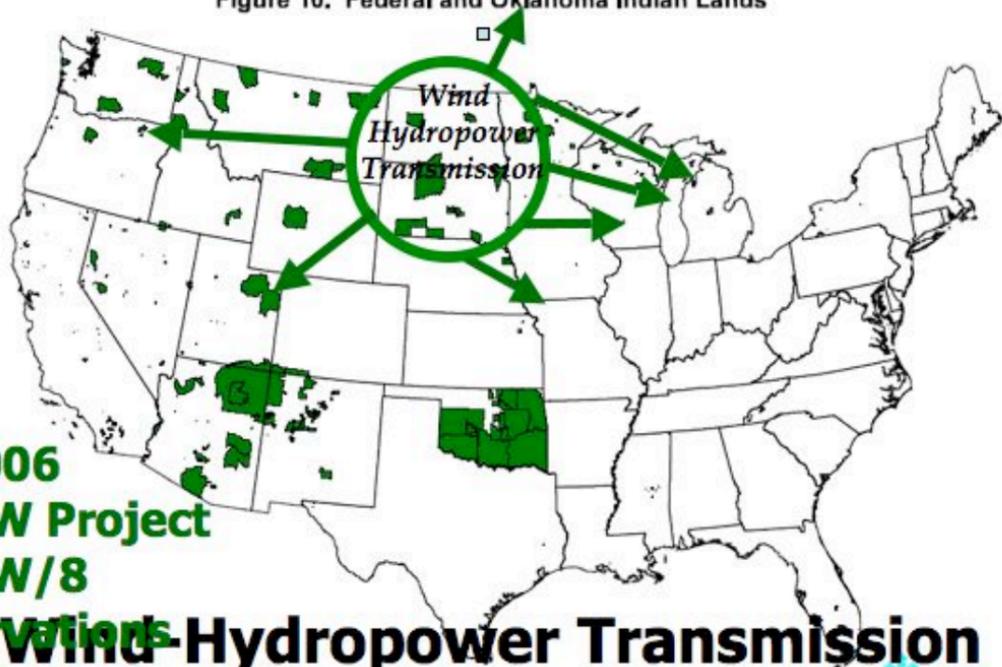


<http://www.wapa.gov/ugp/study/DakotasWind/Zone%20Map.pdf>



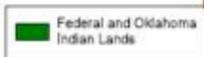
# Intertribal COUP Federal Demonstration Project

Figure 10. Federal and Oklahoma Indian Lands



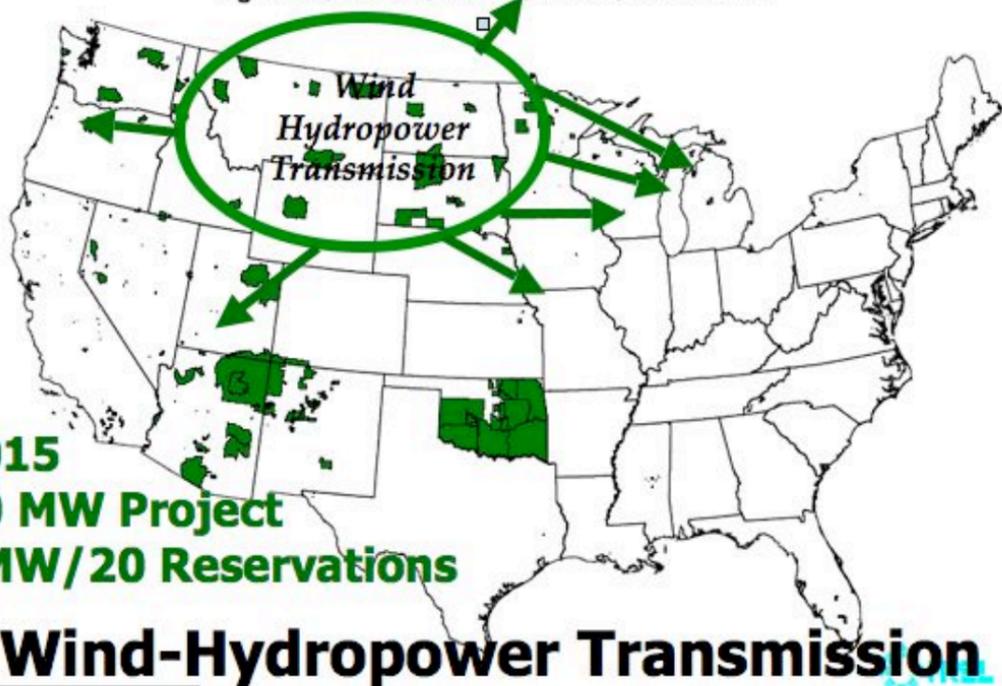
By 2006  
80 MW Project  
10 MW/8  
Reservations

**Wind-Hydropower Transmission**  
COUP Wind EJ Demonstration



# Extended Demonstration Project

Figure 10. Federal and Oklahoma Indian Lands



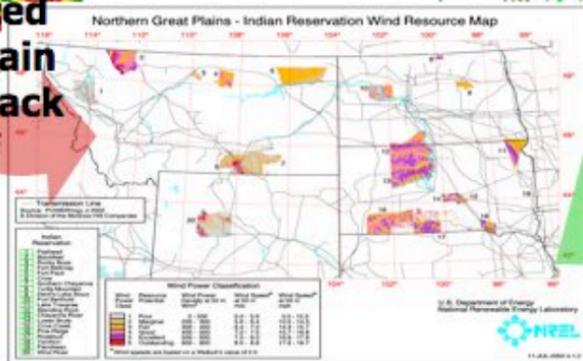
**By 2015**  
**3,000 MW Project**  
**150 MW/20 Reservations**

## Wind-Hydropower Transmission

**COUP Wind EJ Demonstration**

US Dept of Energy - National Renewable Energy Laboratory

# **TRIBAL WIND** - **FEDERAL HYDROPOWER:** Breaking the Positive Feedback Loop in the CO<sub>2</sub> Energy Cycle



**Tribal Wind** can replace diminishing **Federal Hydropower** on **Federal Transmission Grid**.

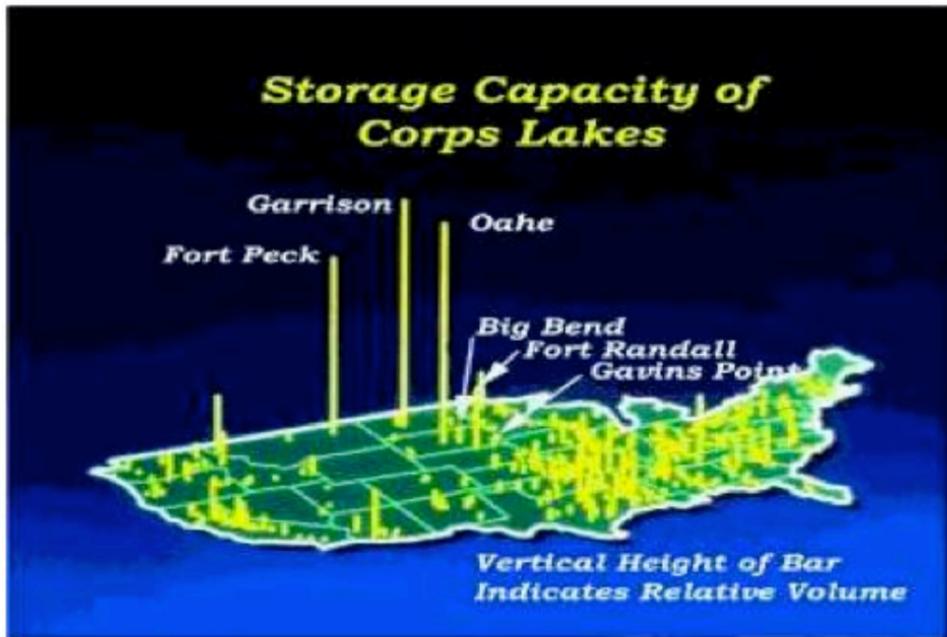
*Missouri River is at all time historical low-water level !*

The present drought and precipitation shifts are consistent with changing climate scenarios associated with increased levels of CO<sub>2</sub> from coal fired power plants -- the "New Normal". While precipitation has shifted to the east, the infrastructure has not. Now, more water falls downstream of the dams, diminishing the hydropower available to WAPA.



# Missouri River Mainstem Dams Provide One of the Largest Hydropower Storage Capacity Systems in the World

The downstream dams at Big Bend, Fort Randall and Gavins Point depend upon utilizing the upstream flow from Fort Peck, Garrison and Oahe. Current climate trends have shifted precipitation from west to east of the dams with far less water entering into the Missouri River behind the dams.



# Tribal WAPA Hydropower Allocation Options

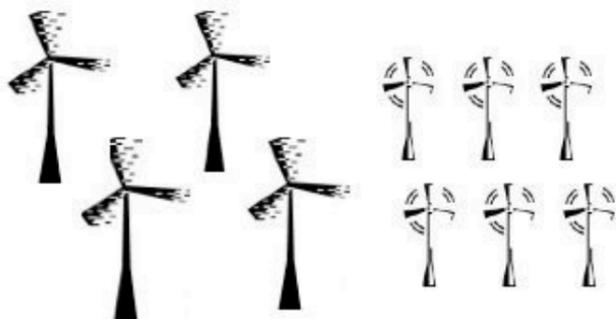
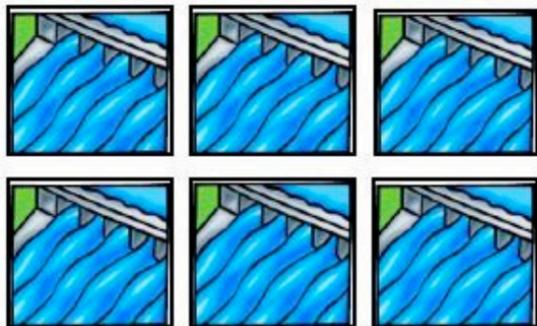
Assume Reservation Load of 10 MegaWatts

Tribes can use their Hydropower Allocations to Firm their own Wind Projects to meet local tribal loads:

6MWs Hydro  
Taken Off the Grid

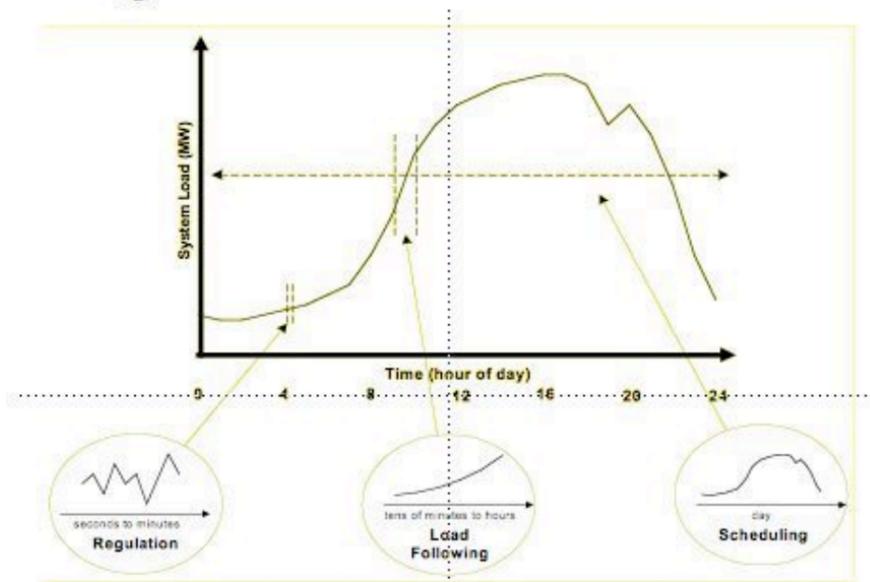
+

10 MWs of Nameplate Wind  
with a 40% Capacity Factor



**6 MWs Hydro + 4 MWs Wind = 10 MWs**

# Wind Integration and Transmission Studies



Regulation = Seconds to Minutes

Load Following = Minutes to Hours

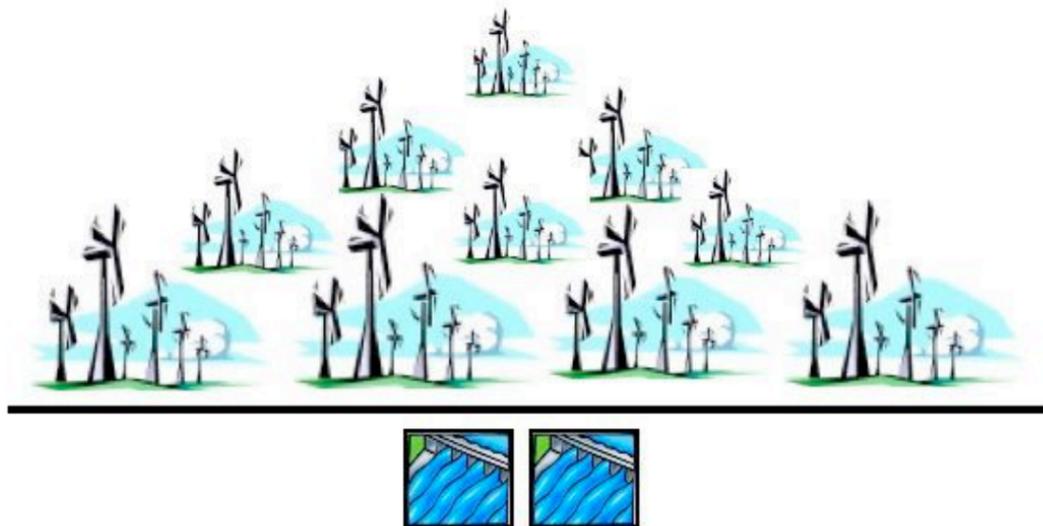
Unit Commitment = Daily Scheduling

# Tribal WAPA Hydropower Allocation Options

Assume Reservation Load of 10 MegaWatts

Tribes can leave a some of their WAPA Hydropower Allocation in the Grid System to support many more MWs of Tribal Wind:

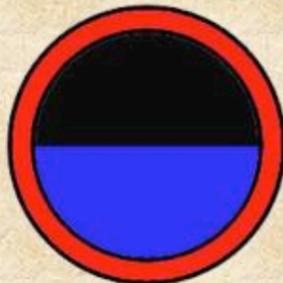
1 to 2 MWs of Hydropower can support 10-50 MWs of Wind



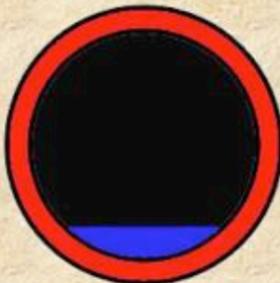
# Integrating Tribal Wind and Federal Hydropower

## Getting Past "Coal Wagging the Water"

Coal has been added to hydropower to meet increased demand



Coal replaced diminishing hydropower capacity

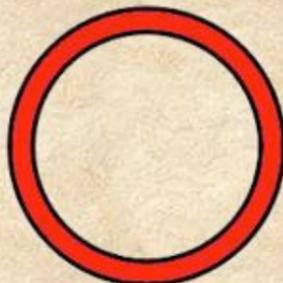


Base load coal diminishes hydro and now uses balance for peaking power

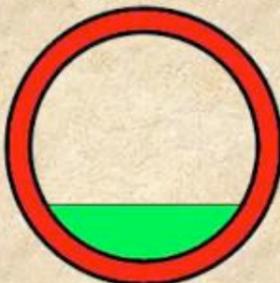


**Result:** There is no place on the grid for non-dispatchable wind power

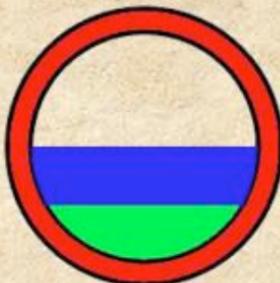
1. Think of grid as if completely open



2. Start w/ least dispatchable wind power



3. Firm up wind w/ available hydro



4. Tweak with remaining hydro & IGCC peakers.



# How Should Our Limited Hydropower and Constrained Transmission System Be Used?

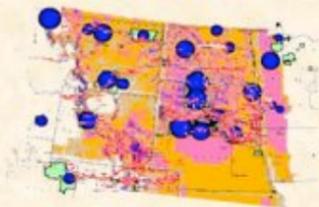
To Continue an Economically Depressed Present:



Supporting only PEAKING POWER to an increasingly more costly baseload coal economy?

or

Or Support a Brighter, Greener, Cleaner Future:

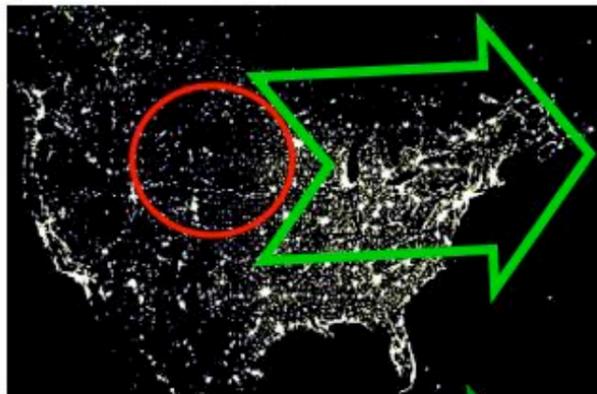
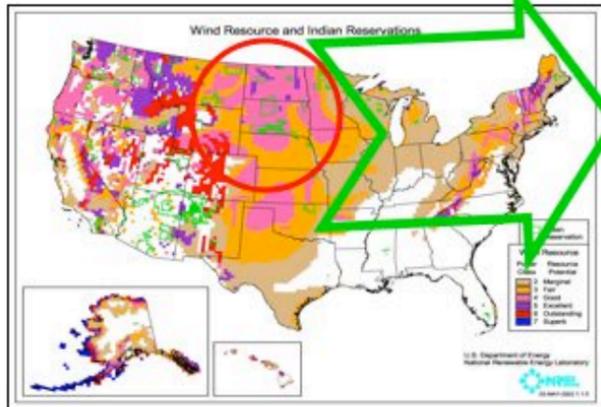


Supporting a New, Expanding and Diversified Wind and Cleaner Coal/Gas (IGCC) Energy Economy?

# Learning We Live In A WINDSHED !

The Richest Wind Energy Regime in the World is Just Upwind from the Region of Greatest Energy Consumption and Acid Rain Impacts in North America!!

**UpWind Generation** ⇨ **DownWind Benefits**



**Sustainable Homeland  
Economic Development  
based on Tribal Wind  
Energy Generation**

**Downwind Communities  
can Support Tribal Wind  
and Benefit from Clean  
Energy and Cleaner Air**



# Where do Green Tags come from?

Global Warming  
Green House Gasses

CO<sub>2</sub>

Air & Water Pollution

SO<sub>x</sub>, NO<sub>x</sub>  
Mercury, Particulates

Health and Environmental  
Costs of Pollution are  
**Externalized** by Utilities

ELECTRICITY

Clean Energy is  
Supported by  
Buyers of

Environmental  
Benefits

Green Tags  
or  
Renewable  
Energy Credits

# *NativeEnergy* is now Native-Owned!



Intertribal COUP Executive Council and the founders of *NativeEnergy*

**Intertribal COUP acquires majority stake in leading renewable energy marketer, on behalf of its member tribes.**

Rosebud, SD and Charlotte, VT (August 16, 2005) – *NativeEnergy*, a leading national marketer of Renewable Energy Credits (RECs) and greenhouse gas offsets, and the nonprofit **Intertribal Council On Utility Policy (COUP)**, announced today that COUP has acquired a majority interest in *Native...*

Offset Now

WindBuilders<sup>sm</sup>

Products & Services

CoolHome<sup>sm</sup>

In The News

About Us

Privacy Promise

Carbon Calculator



**Syriana**  
becomes  
**Climate Neutral**  
with  
**NativeEnergy!**

## Welcome to NativeEnergy!

We're here to help you fight global warming and climate change. Take a few minutes to help build a new wind farm or a renewable farm methane project today, and enjoy a climate neutral lifestyle.

**New Projects!** *WindBuilders<sup>sm</sup>* helped build [MHA Nation Single Turbine Project](#), and *CoolHome<sup>sm</sup>* helping build the [Schrack Family Dairy Farm Methane Project](#).

**You'll be in good company** – [see who's joined](#) us to fight global warming.

**Give a special gift** that saves a [ton of CO<sub>2</sub>](#)

**[Offset your Travel Today!](#)**



**CREATING SUSTAINABLE  
COMMUNITIES** JUNE 8-10

**CLICK HERE FOR MORE**



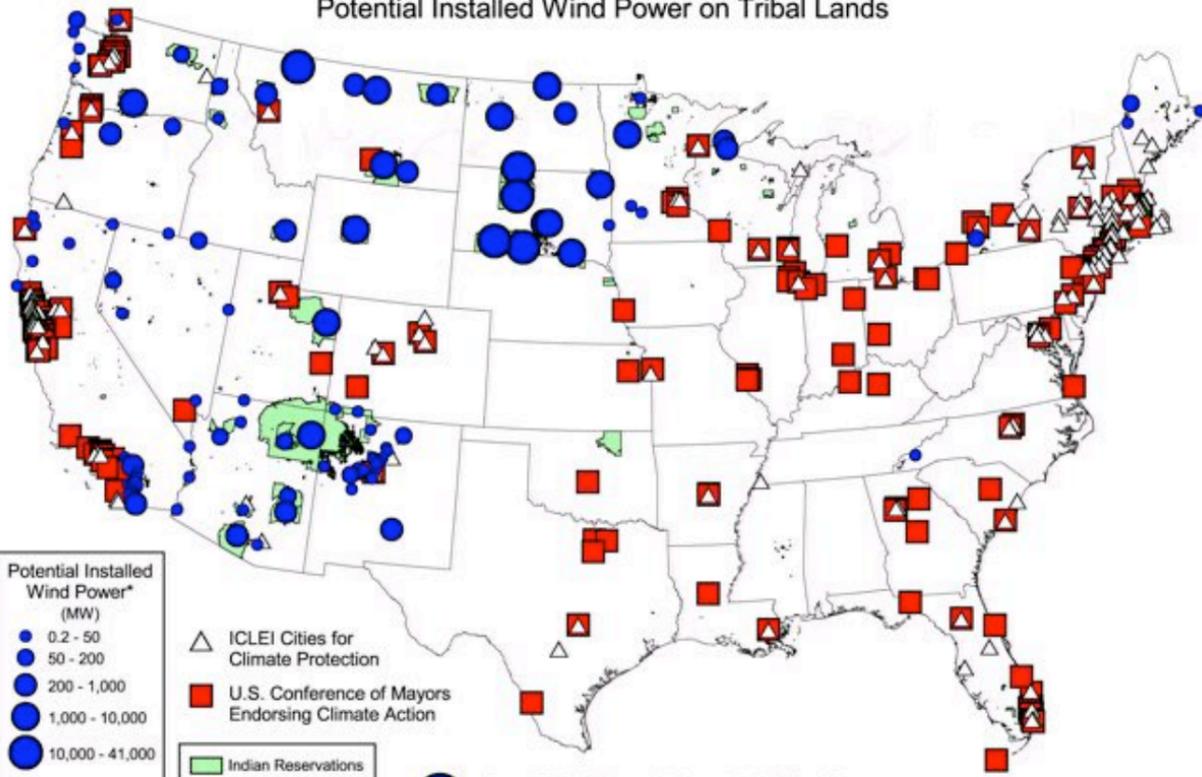
"Ben & Jerry's is excited to support the development of the Rosebud Wind Turbine. By working with NativeEnergy we are able to address our global warming impact and provide important social and environmental justice benefits to the Rosebud Sioux Tribe."

Andrea Asch,  
Manager of Natural Resources  
Ben & Jerry's Homemade

What are other leaders saying  
about NativeEnergy?

[Click here](#)

## Potential Installed Wind Power on Tribal Lands



\* Installed power estimated for areas of class  $\geq 4$  annual avg. wind resource assuming 5 MW/km<sup>2</sup> of installed capacity.

Aggregate technical estimate of 209 GW does not account for sacred sites, transmission access, water bodies, or other factors that will significantly impact development potential.

 Total Tribal Potential Installed Wind Power:  
209,639 MW

 U.S. Total Installed Electric Power (2004 Est.):  
944,000 MW (EIA)

U.S. Department of Energy  
National Renewable Energy Laboratory

