Joseph Brignolo

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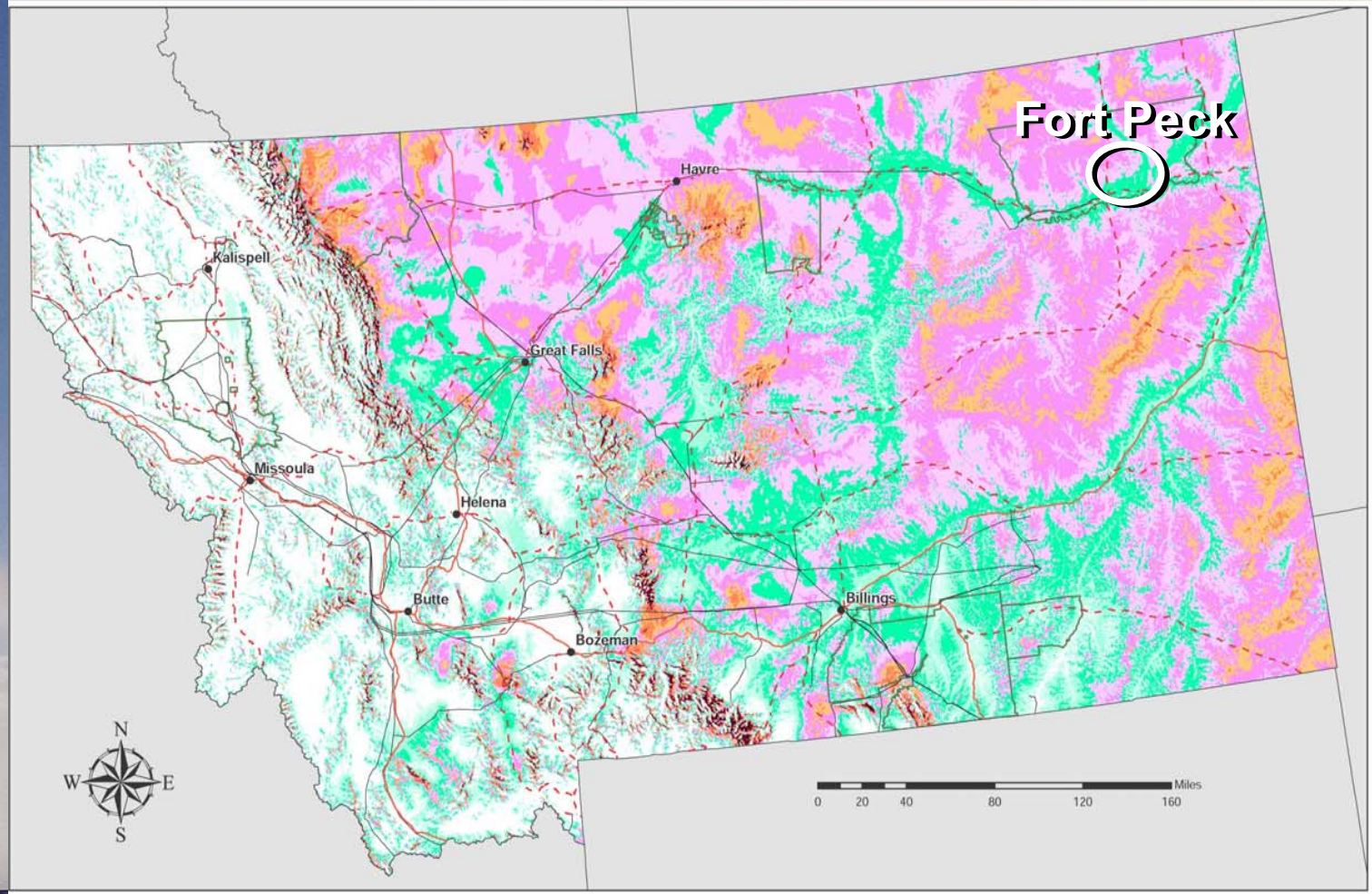
ASSINIBOINE & SIOUX TRIBES
at FORT PECK
WIND ENERGY
DEVELOPMENT PROJECT

WINDPOWERMAPS.org

Montana Wind Speed at 50 Meters



Wind Speed at 50 meters

	m/s	mph
	0 - 5.0	0 - 11.2
	5.0 - 5.5	11.2 - 12.3
	5.5 - 6.0	12.3 - 13.4
	6.0 - 6.5	13.4 - 14.5
	6.5 - 7.0	14.5 - 15.7
	7.0 - 7.5	15.7 - 16.8
	7.5 - 8.0	16.8 - 17.9
	8.0 - 8.5	17.9 - 19.0
	8.5 - 9.0	19.0 - 20.1
	9.0 - 9.5	20.1 - 21.3
	9.5 - 10.0	21.3 - 22.4
	>10.0	>22.4

- Major Cities
- Transmission Lines > 115 KW
- Limited Access Highway
- Highway
- Tribal Reservations

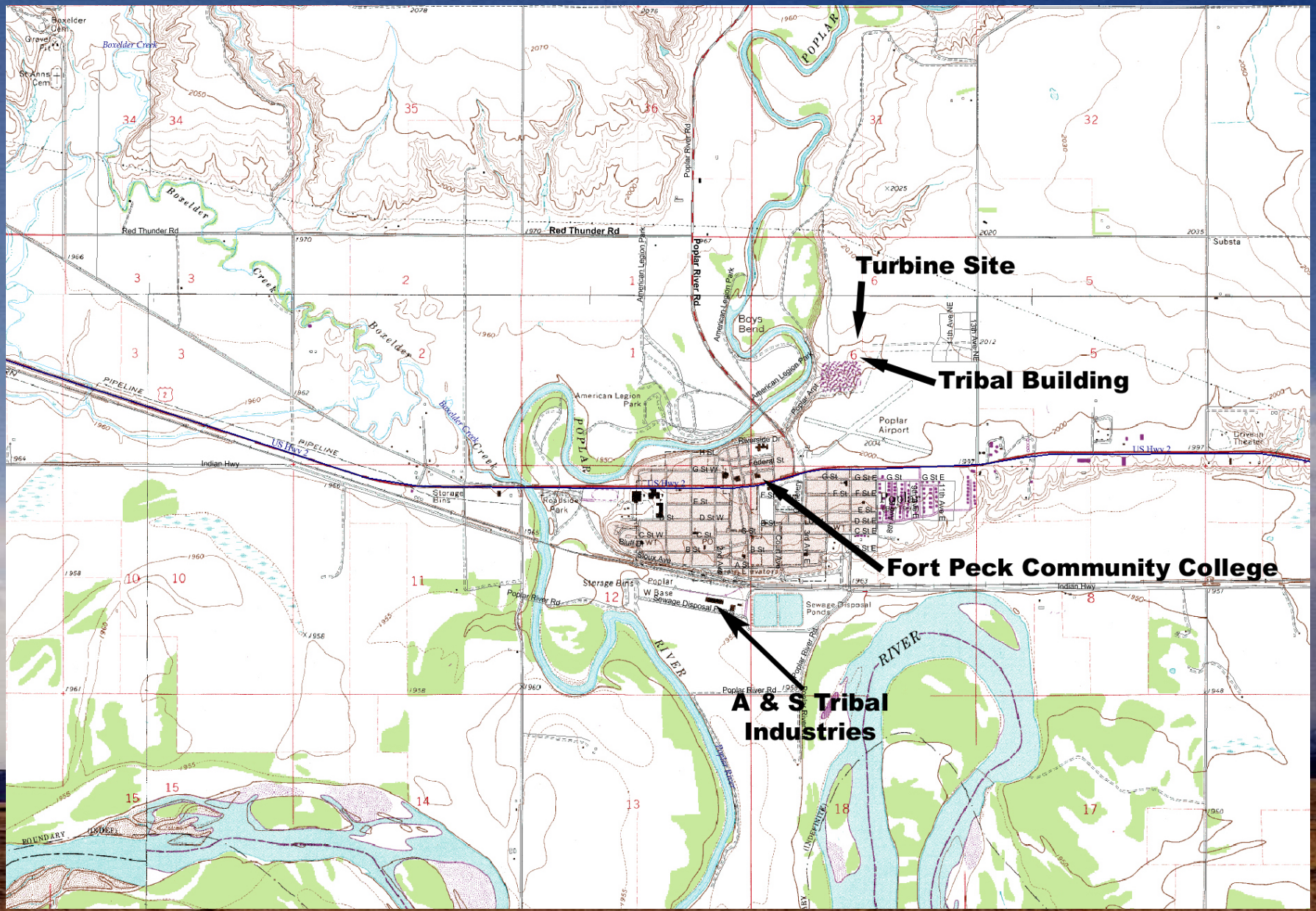
The wind resource estimates presented on this map were developed by TrueWind Solutions using MesoMap, a mesoscale atmospheric simulation system, at a spatial grid resolution of 400 meters (one-quarter mile). The estimates have been validated by the National Renewable Energy Laboratory (NREL) and independent meteorologist but should be confirmed by direct measurement according to wind energy industry standards.

Northwest Cooperative Development Center · TrueWind Solutions · Bonneville Power Administration · NREL · Northwest SEED · Integral GIS

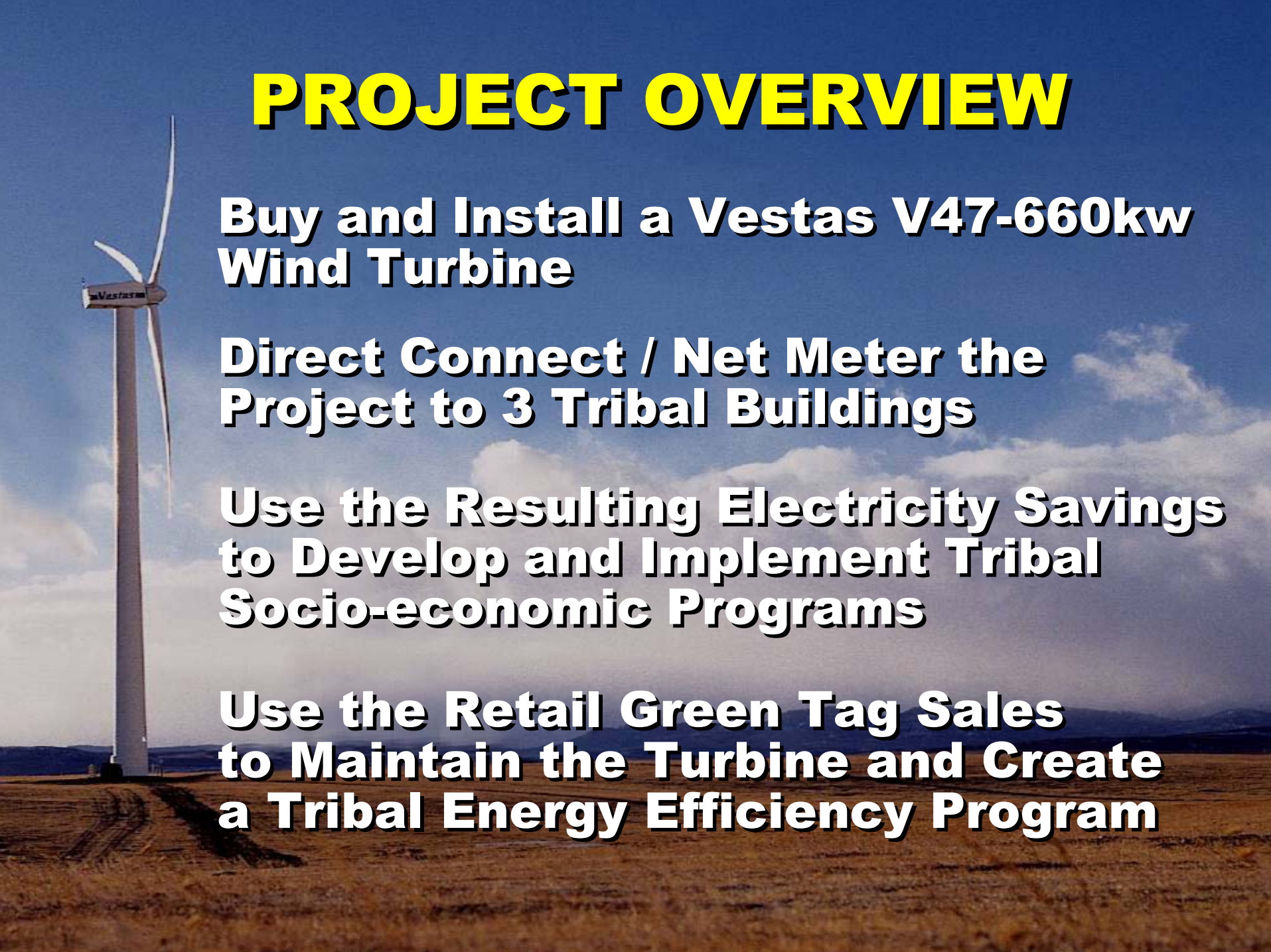
Project Sponsors

NREL, the Bonneville Power Administration, Northwestern Energy, the Wyoming Business Council, enXco, the Northwest Power Planning Council, Zilkha Renewable Energy, Klickitat County, EnronWind, ABB, Renewable Energy Systems (USA) Inc., Chelan Public Utility District, Idaho Power, Windland, Inc., WSACAA Energy Project, Vestas, Jones & Stokes, CH2M Hill, Suzlon Energy, Northwest Wildlife Consultants, Inc., and Cielo Wind Power.

For more information see www.windpowermaps.org



Foundation for the American Indian



PROJECT OVERVIEW

Buy and Install a Vestas V47-660kw Wind Turbine

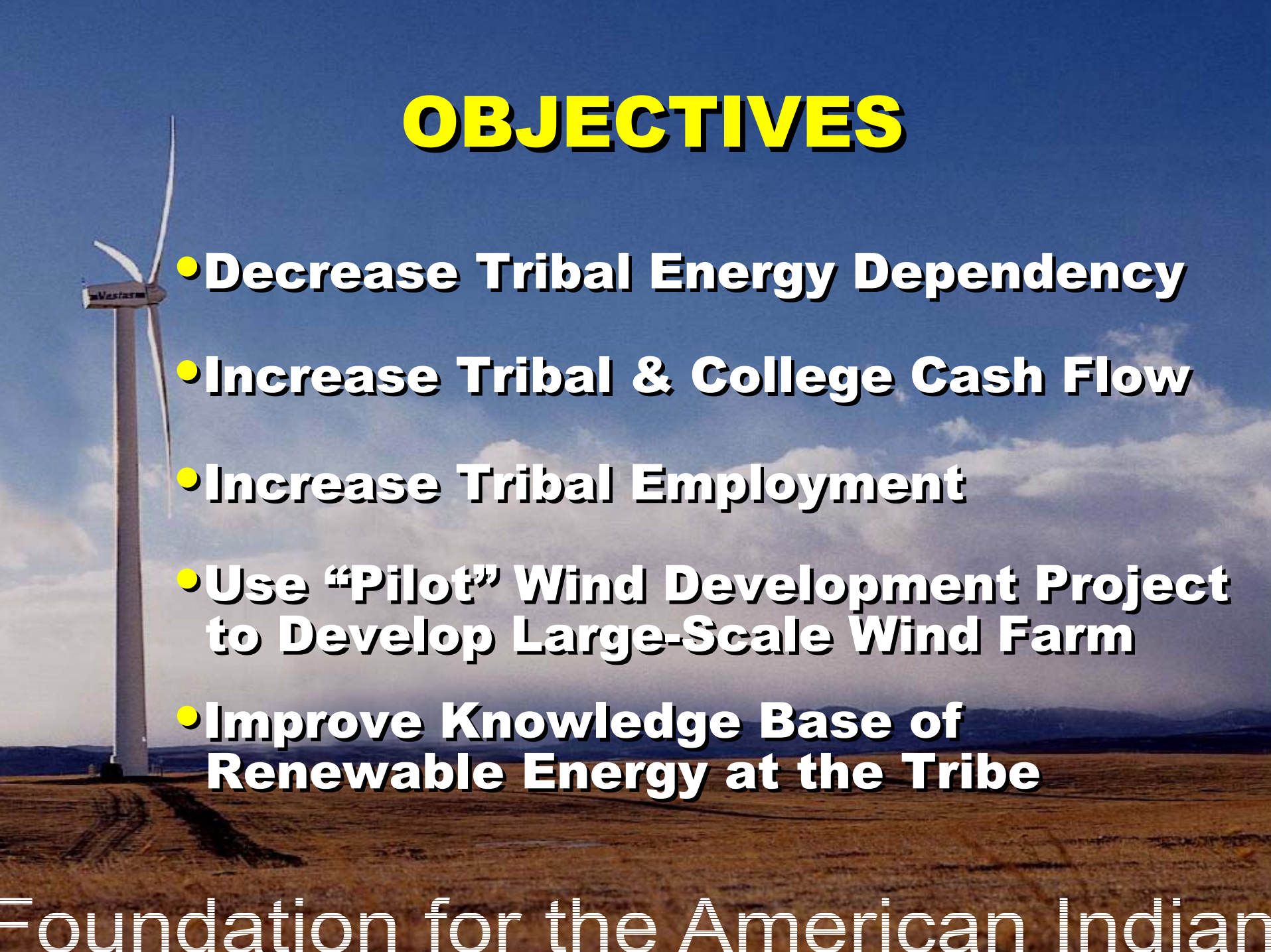
Direct Connect / Net Meter the Project to 3 Tribal Buildings

Use the Resulting Electricity Savings to Develop and Implement Tribal Socio-economic Programs

Use the Retail Green Tag Sales to Maintain the Turbine and Create a Tribal Energy Efficiency Program

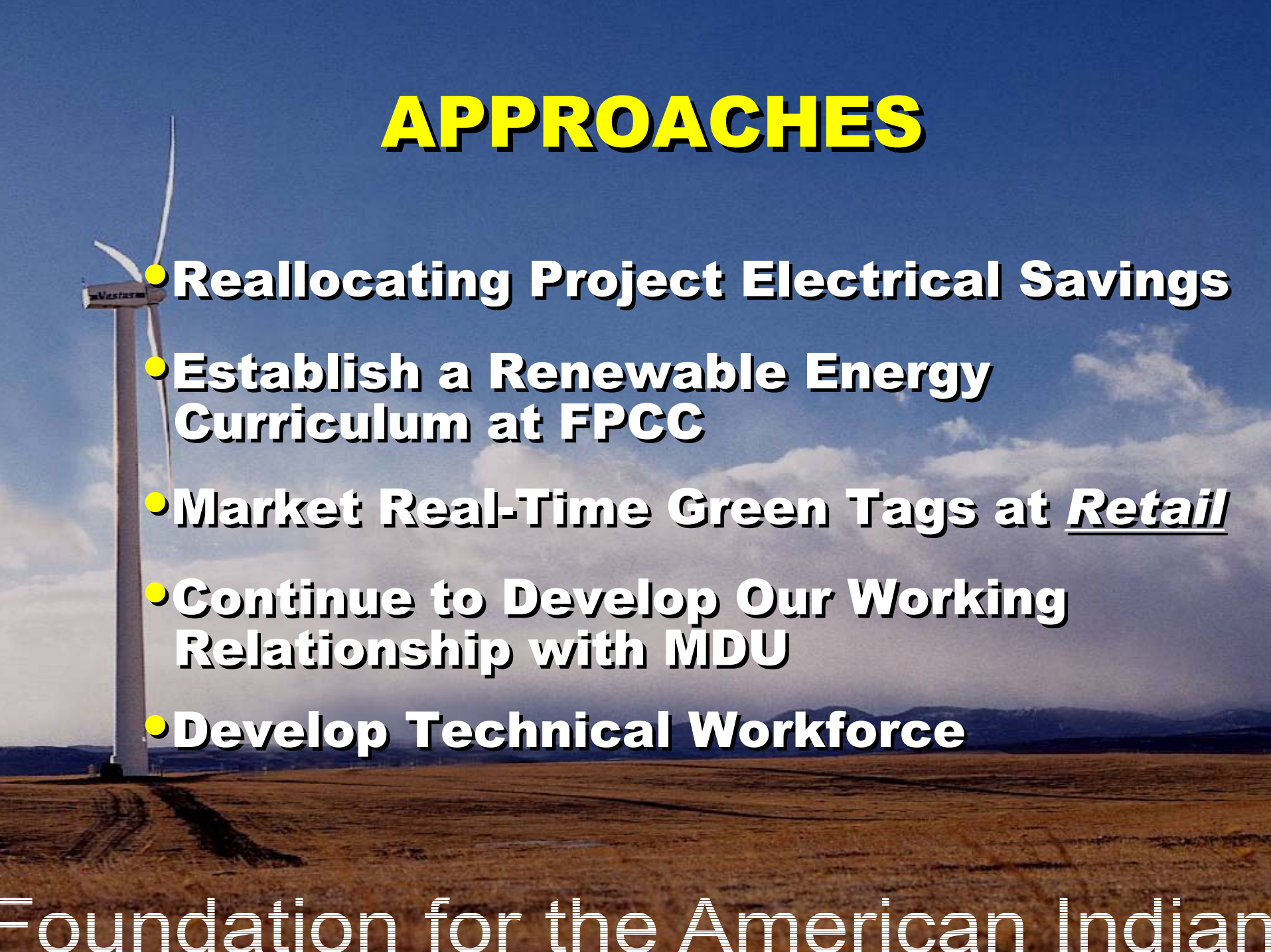
PROJECT PARTICPANTS

- Department of Energy / NREL
- Fort Peck Community College
- Foundation of the American Indian
- Vestas American Wind Turbines
- Florida Power and Light Energy
- Patrick and Henderson
- Barnhart Crane and Rigging Company
- Montana-Dakota Utilities



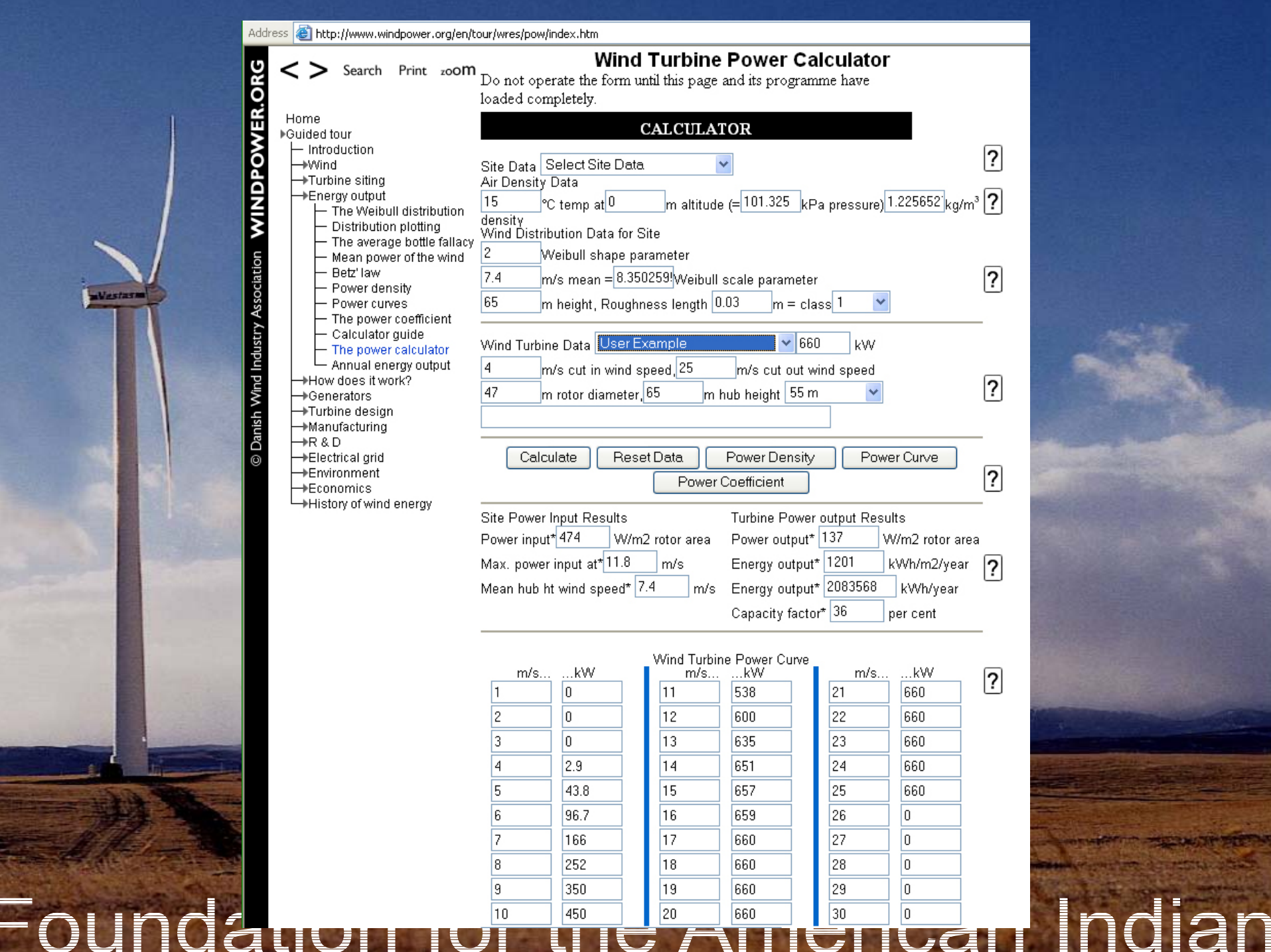
OBJECTIVES

- Decrease Tribal Energy Dependency
- Increase Tribal & College Cash Flow
- Increase Tribal Employment
- Use "Pilot" Wind Development Project to Develop Large-Scale Wind Farm
- Improve Knowledge Base of Renewable Energy at the Tribe



APPROACHES

- Reallocating Project Electrical Savings
- Establish a Renewable Energy Curriculum at FPCC
- Market Real-Time Green Tags at ***Retail***
- Continue to Develop Our Working Relationship with MDU
- Develop Technical Workforce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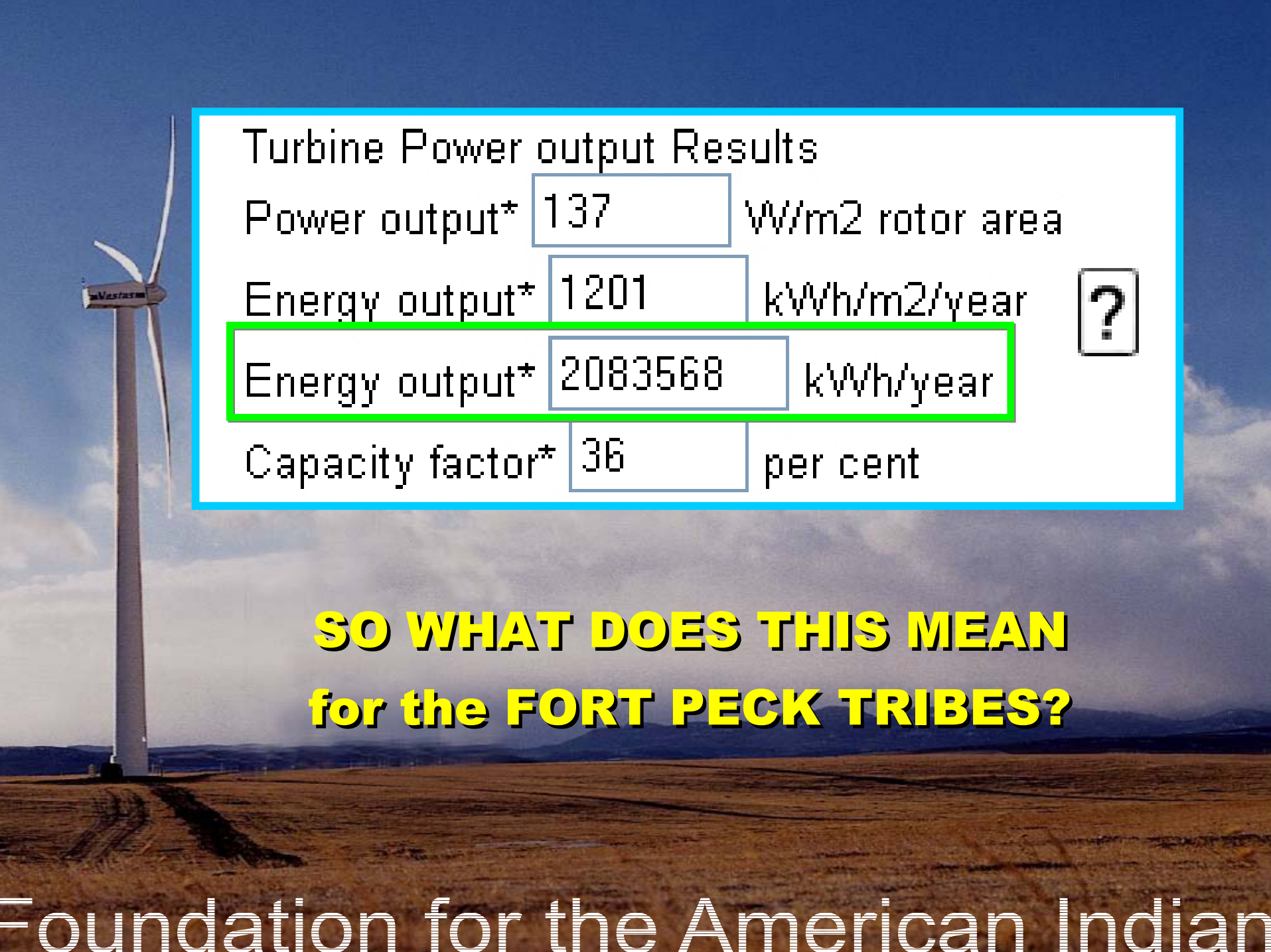
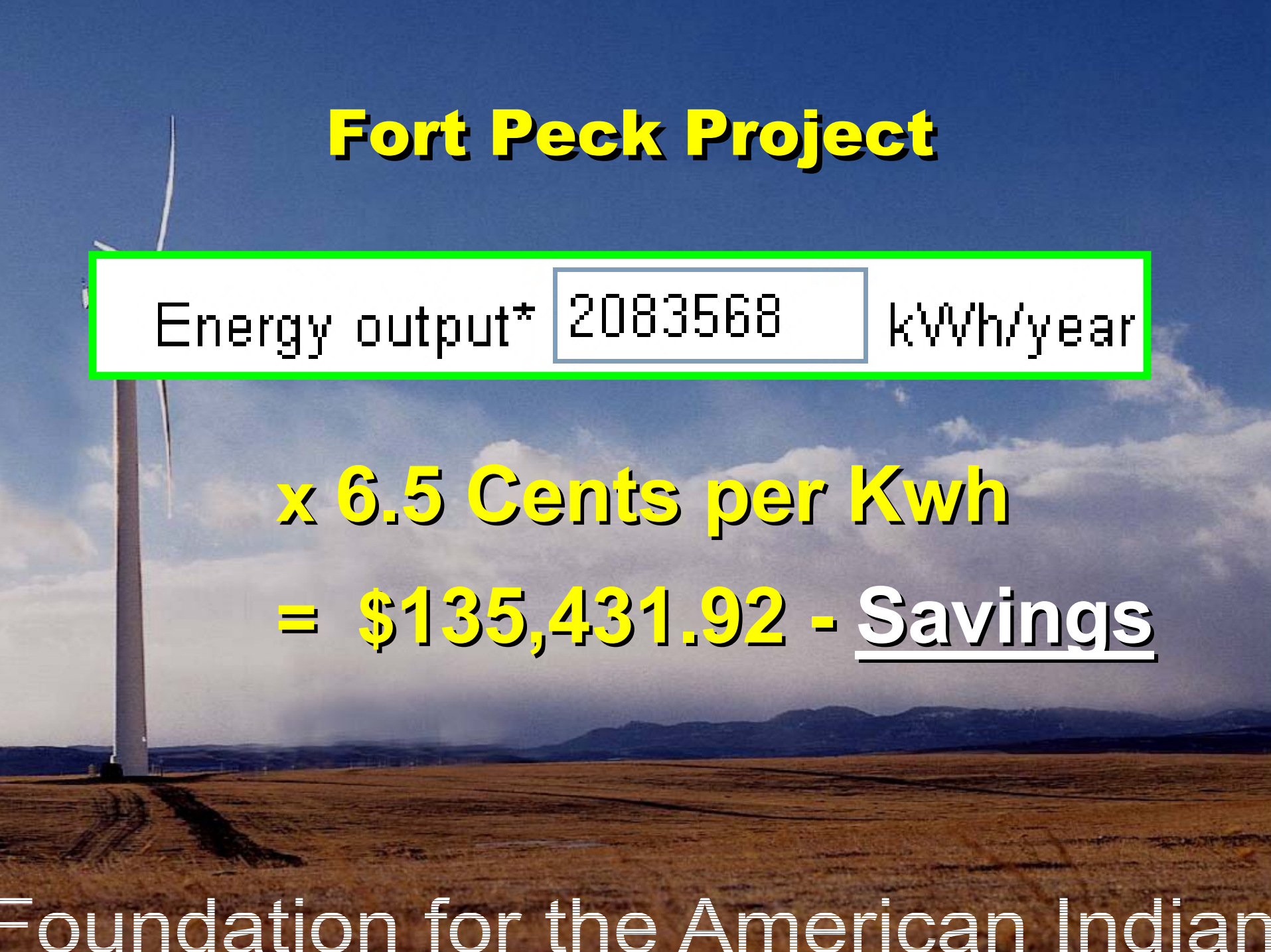
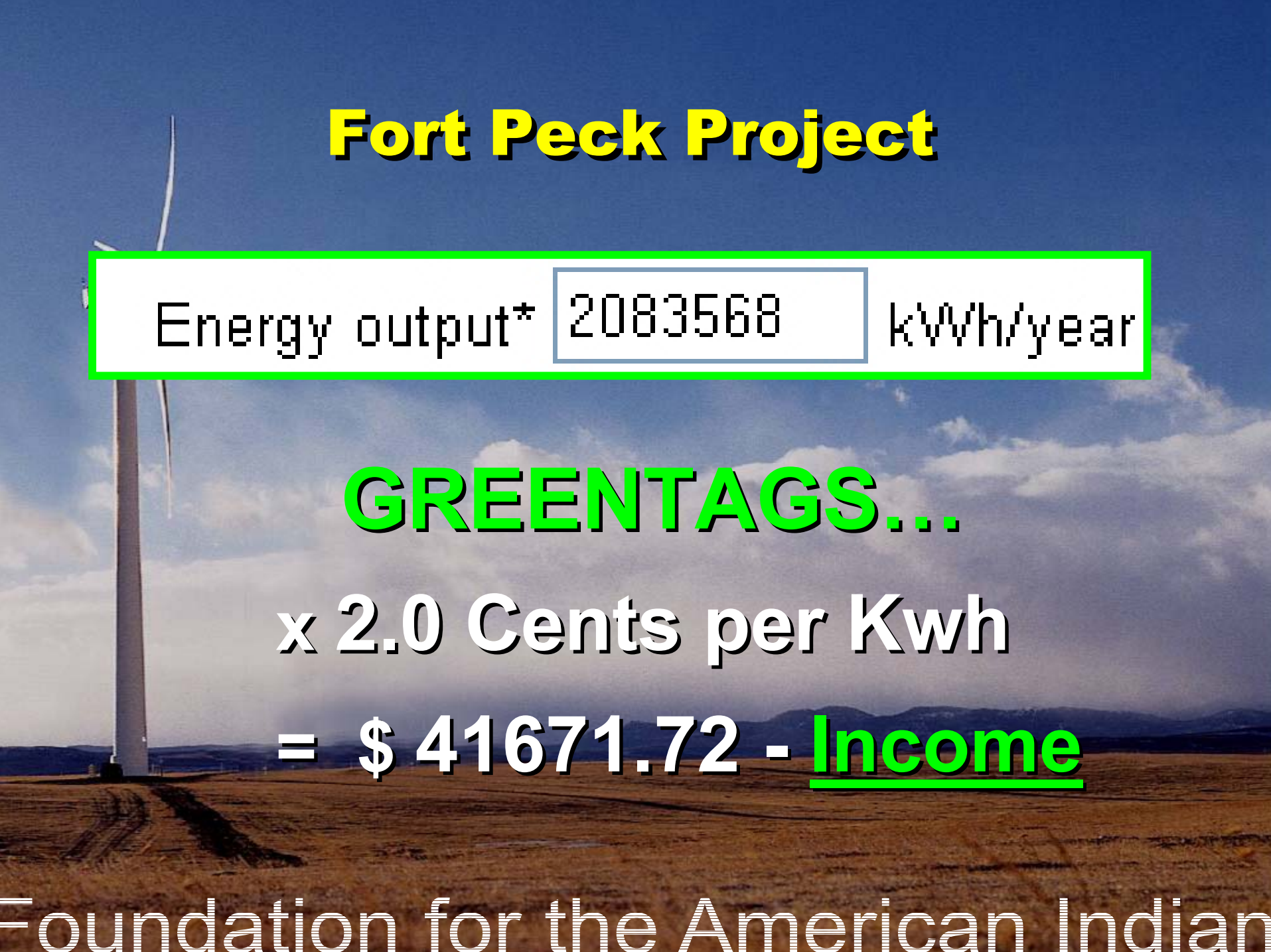
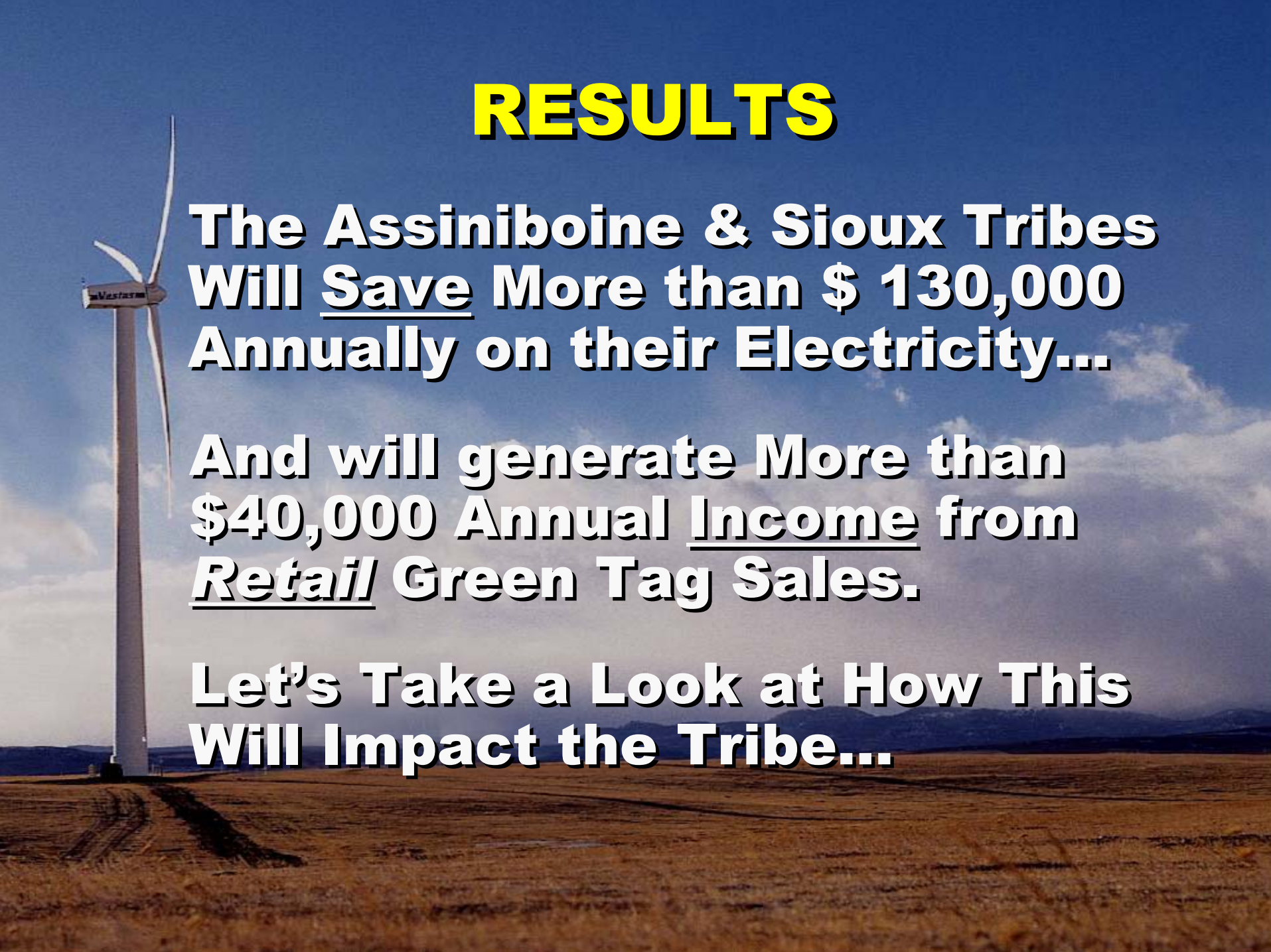
Energy output
The Weibull distribution
Distribution plotting
The average bottle fallacy
Mean power of the wind
Betz' law
Power density
Power curves
The power coefficient
Calculator guide
The power calculator
Annual energy output
How does it work?
Generators
Turbine design
Manufacturing
R & D
Electrical grid
Environment
Economics
History of wind energy
Wind Turbine Power Calculator
Do not operate the form until this page and its programme have loaded completely.
CALCULATOR
Site Data Select Site Data
Air Density Data
15 °C temp at 0 m altitude (= 101.325 kPa pressure) 1.225652 kg/m³ density
Wind Distribution Data for Site
2 Weibull shape parameter
7.4 m/s mean = 8.350259 Weibull scale parameter
65 m height, Roughness length 0.03 m = class 1
Wind Turbine Data User Example 660 kW
4 m/s cut in wind speed, 25 m/s cut out wind speed
47 m rotor diameter, 65 m hub height 55 m
Calculate Reset Data Power Density Power Curve
Power Coefficient
Site Power Input Results
Power input* 474 W/m2 rotor area
Max. power input at* 11.8 m/s
Mean hub ht wind speed* 7.4 m/s
Turbine Power output Results
Power output* 137 W/m2 rotor area
Energy output* 1201 kWh/m2/year
Energy output* 2083568 kWh/year
Capacity factor* 36 per cent
Wind Turbine Power Curve
m/s... ...kW
1 0
2 0
3 0
4 2.9
5 43.8
6 96.7
7 166
8 252
9 350
10 450
11 538
12 600
13 635
14 651
15 657
16 659
17 660
18 660
19 660
20 660
21 660
22 660
23 660
24 660
25 660
26 0
27 0
28 0
29 0
30 0


Turbine Power output Results
Power output* 137 W/m2 rotor area
Energy output* 1201 kWh/m2/year
?
Energy output* 2083568 kWh/year
Capacity factor* 36 per cent
SO WHAT DOES THIS MEAN
for the FORT PECK TRIBES?
Foundation for the American Indian


Fort Peck Project
Energy output* 2083568 kWh/year
x 6.5 Cents per Kwh
= $135,431.92 - Savings
Foundation for the American Indian


Fort Peck Project
Energy output* 2083568 kWh/year
GREENTAGS...
x 2.0 Cents per Kwh
= $ 41671.72 - Income
Foundation for the American Indian

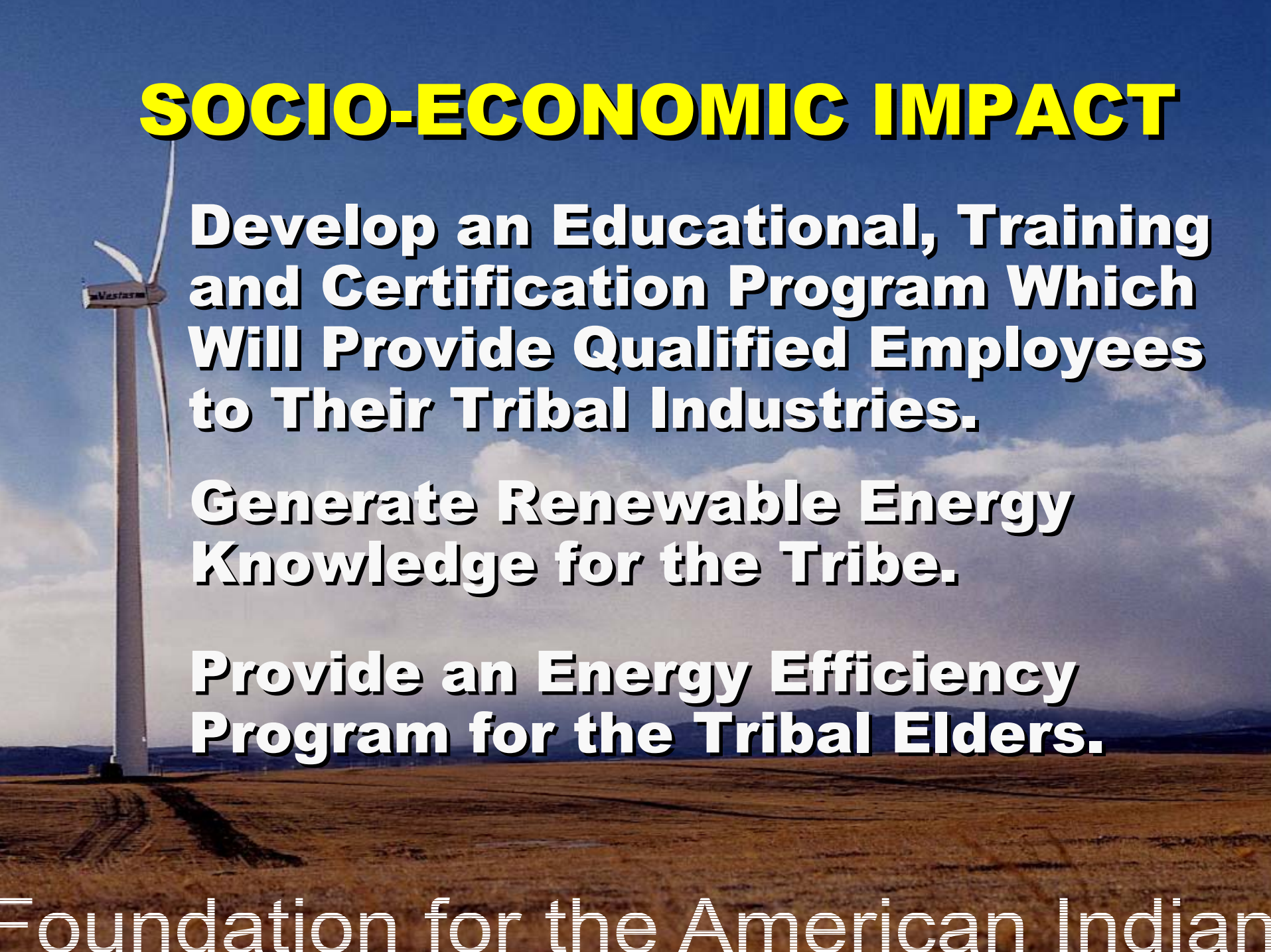


RESULTS

The Assiniboine & Sioux Tribes Will Save More than $ 130,000 Annually on their Electricity…

And will generate More than $40,000 Annual Income from *Retail* Green Tag Sales.

Let's Take a Look at How This Will Impact the Tribe…



SOCIO-ECONOMIC IMPACT

Develop an Educational, Training and Certification Program Which Will Provide Qualified Employees to Their Tribal Industries.

Generate Renewable Energy Knowledge for the Tribe.

Provide an Energy Efficiency Program for the Tribal Elders.

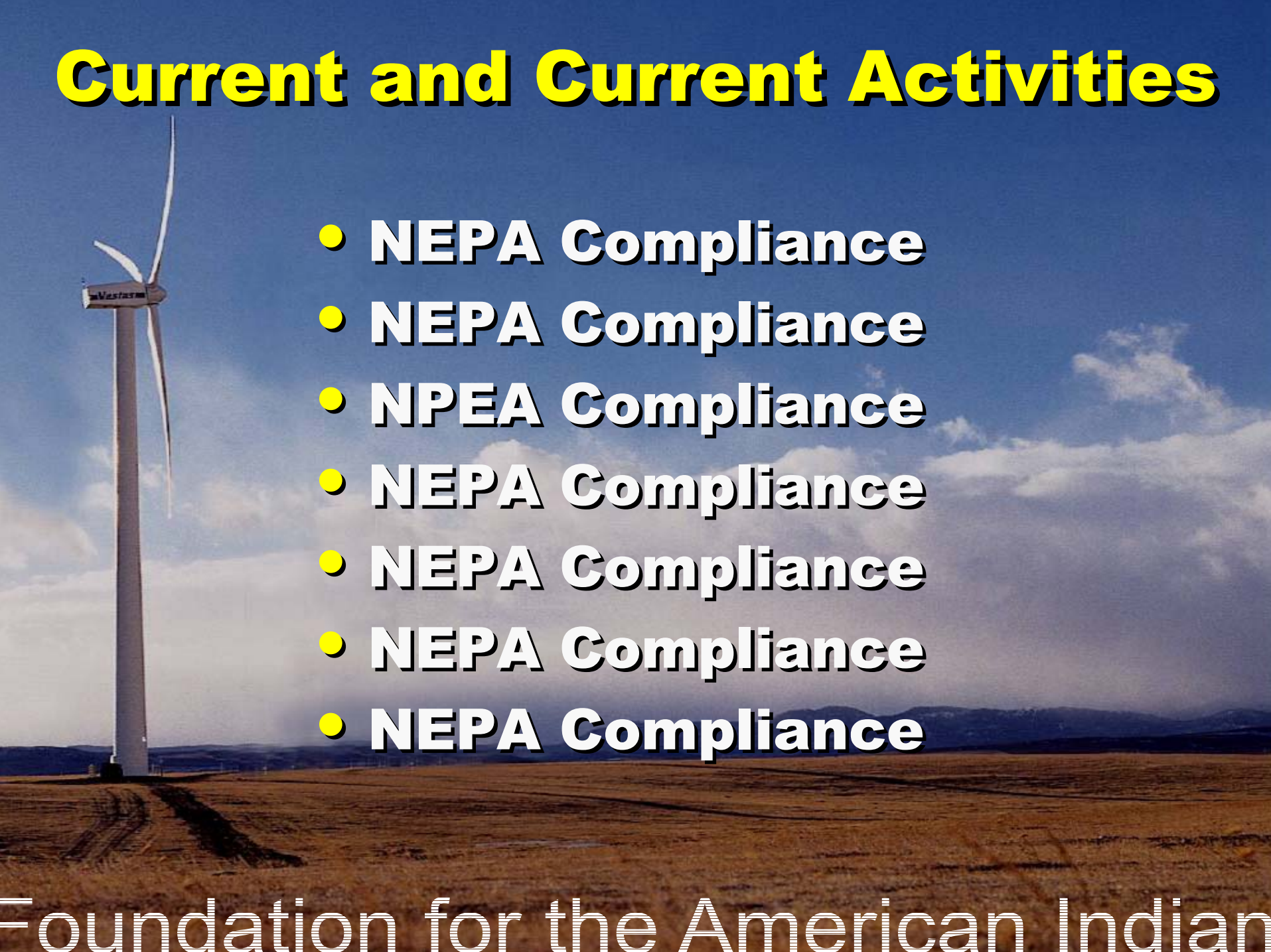
Technical and Management Issues

- NEPA Compliance
- Soil Samples
- Foundation Design
- Weather Cooperation
- Turbine Delivery and
- Crane Schedule (Lifting/Rigging)
- Interconnect
- Socio-economic Programs
- Web Site Development

Current and Future Activities

- Permitting
- Interconnect Agreement
- "Green-e" Certification
- Retail Sales of Green Tags
- Renewable Energy Curriculum
- Contract Negotiations
- Web Site Development

Current and Current Activities



- NEPA Compliance
- NEPA Compliance
- NPEA Compliance
- NEPA Compliance
- NEPA Compliance
- NEPA Compliance
- NEPA Compliance

Future Plans

- Project Expansion
- Wolf Point Turbine
- Native American *Real-Time* Green Tags Marketing Company
- Replicating the FPCC and TMCC Projects at other Tribal Colleges
- Provide Assistance to the State of Montana for Renewable Energy

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Turtle Mountain Community College
Wind Turbine Foundation Installation
Belcourt, North Dakota
Bobcat


MITSUBISH


MITSUBISHI


Bobcat


B O R


ISUZU
BOTTINEAU


MITSUBISHI


Mitsubishi


LOAD

Foundat n Indian

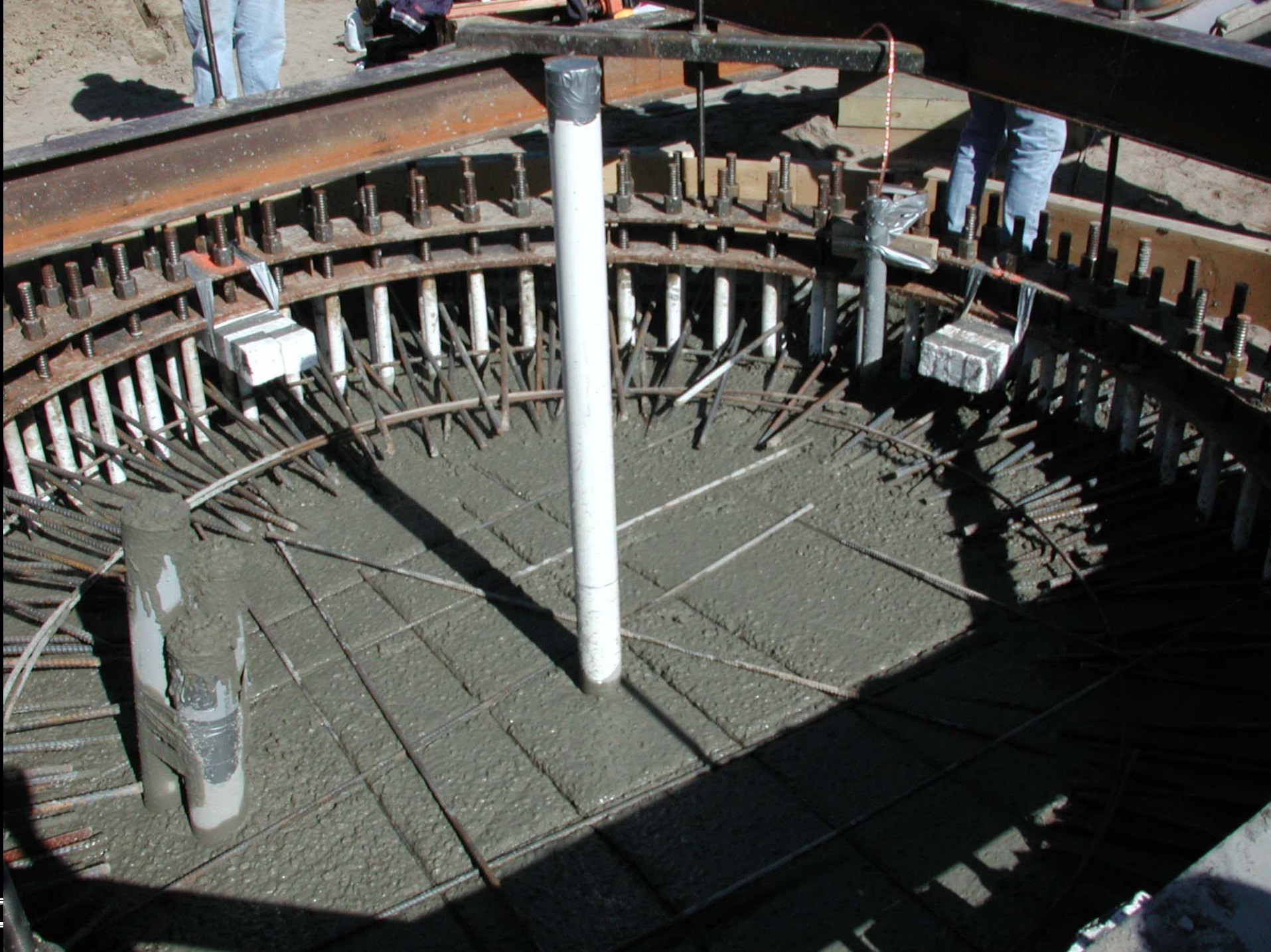

BORSHEIM

Foundat n Indian


Living on the Edge
Nielsen Roofing & Repair
Granville, ND

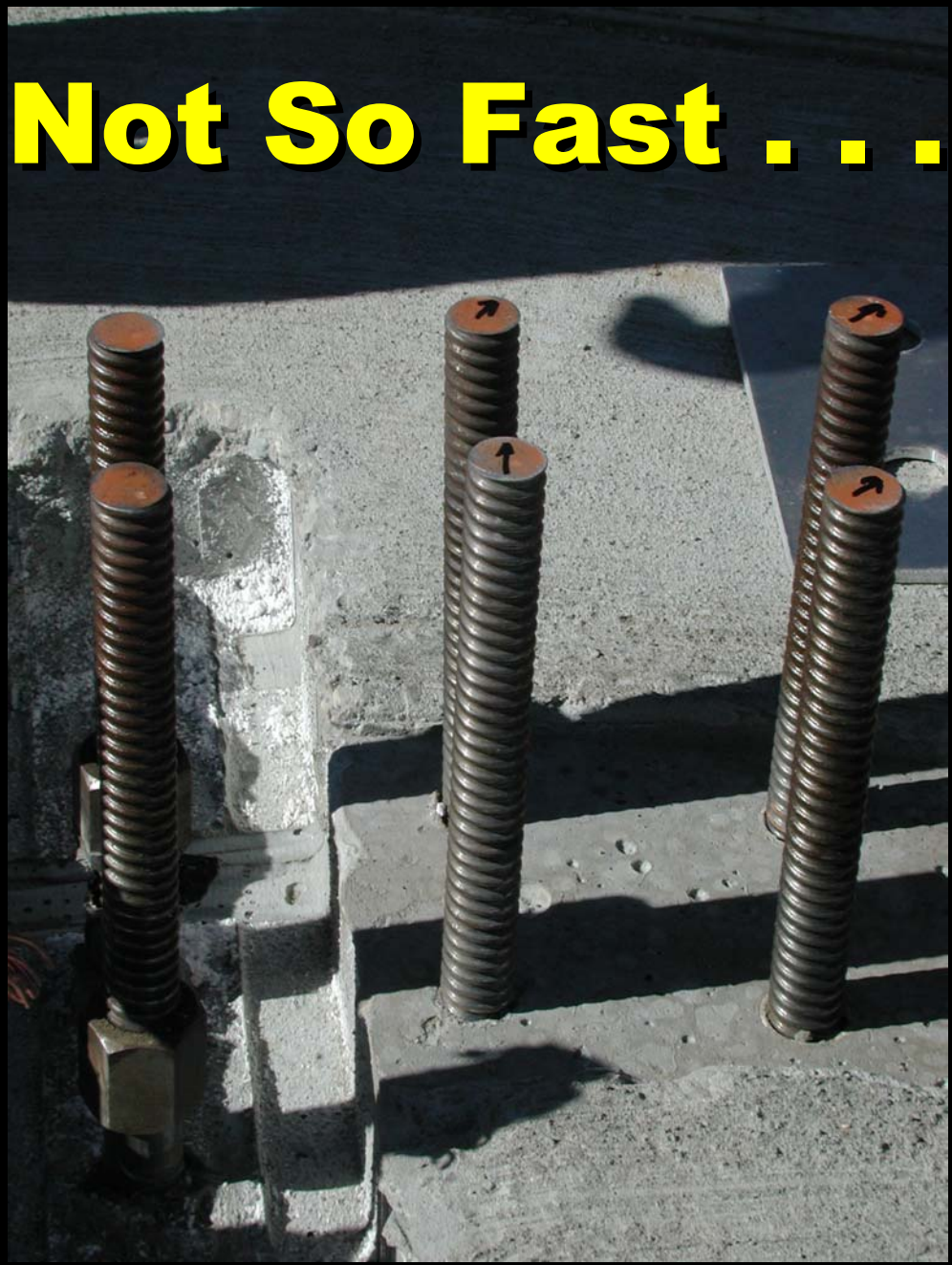

McNeilus


NIKE




MITSUBISHI

Not So Fast . . .



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