



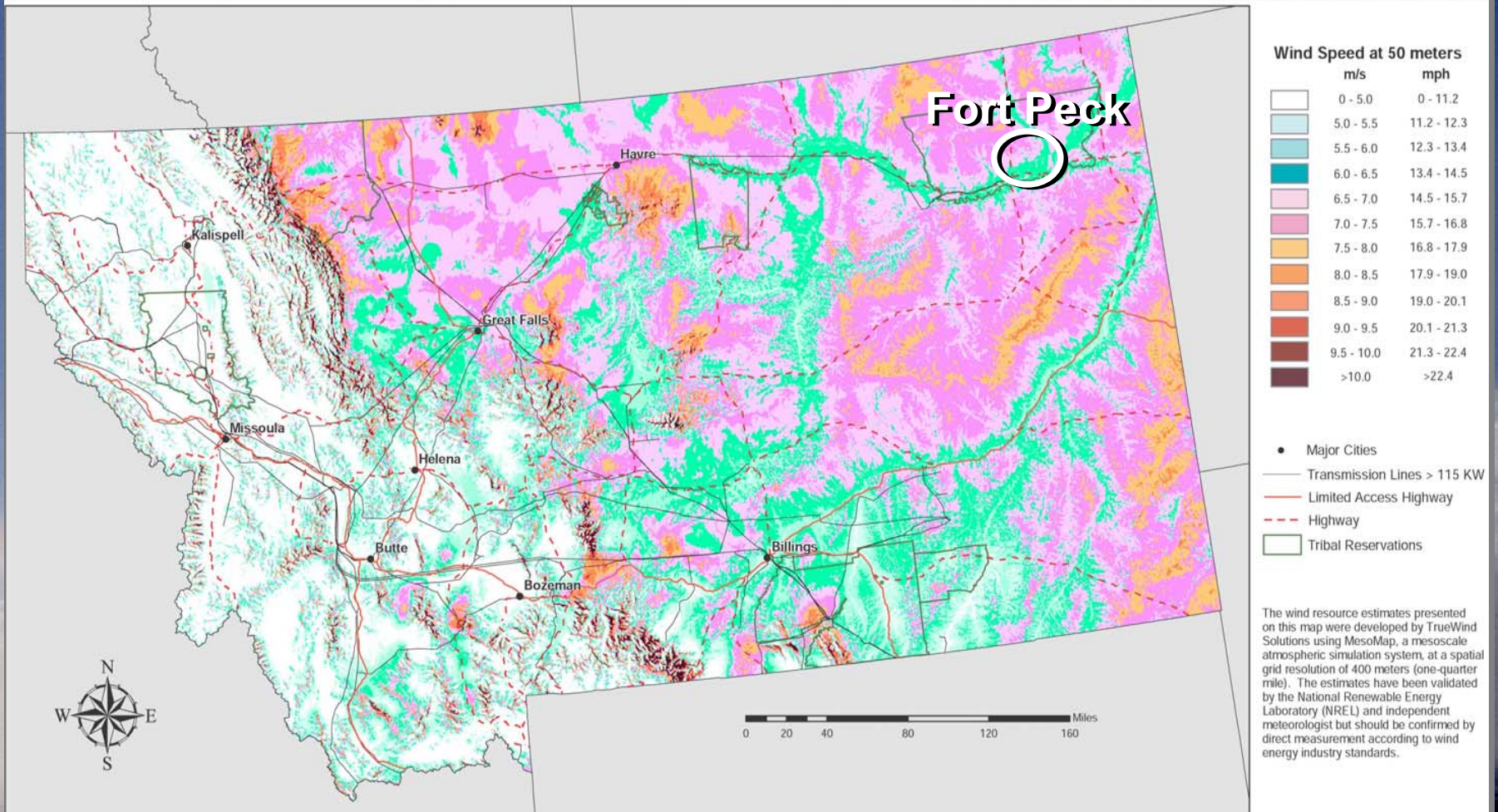
Joseph Brignolo

Vice President, Operations and Program Development, FAI

Project Manager/Technical Director, Fort Peck Wind Development Project

A tall, white wind turbine stands on the left side of the image, its blades partially visible against a blue sky with scattered white clouds. The ground is a flat, brownish field with some tire tracks. In the distance, there are low, hazy mountains.

ASSINIBOINE & SIOUX TRIBES
at FORT PECK
WIND ENERGY
DEVELOPMENT PROJECT



Northwest Cooperative



Development Center



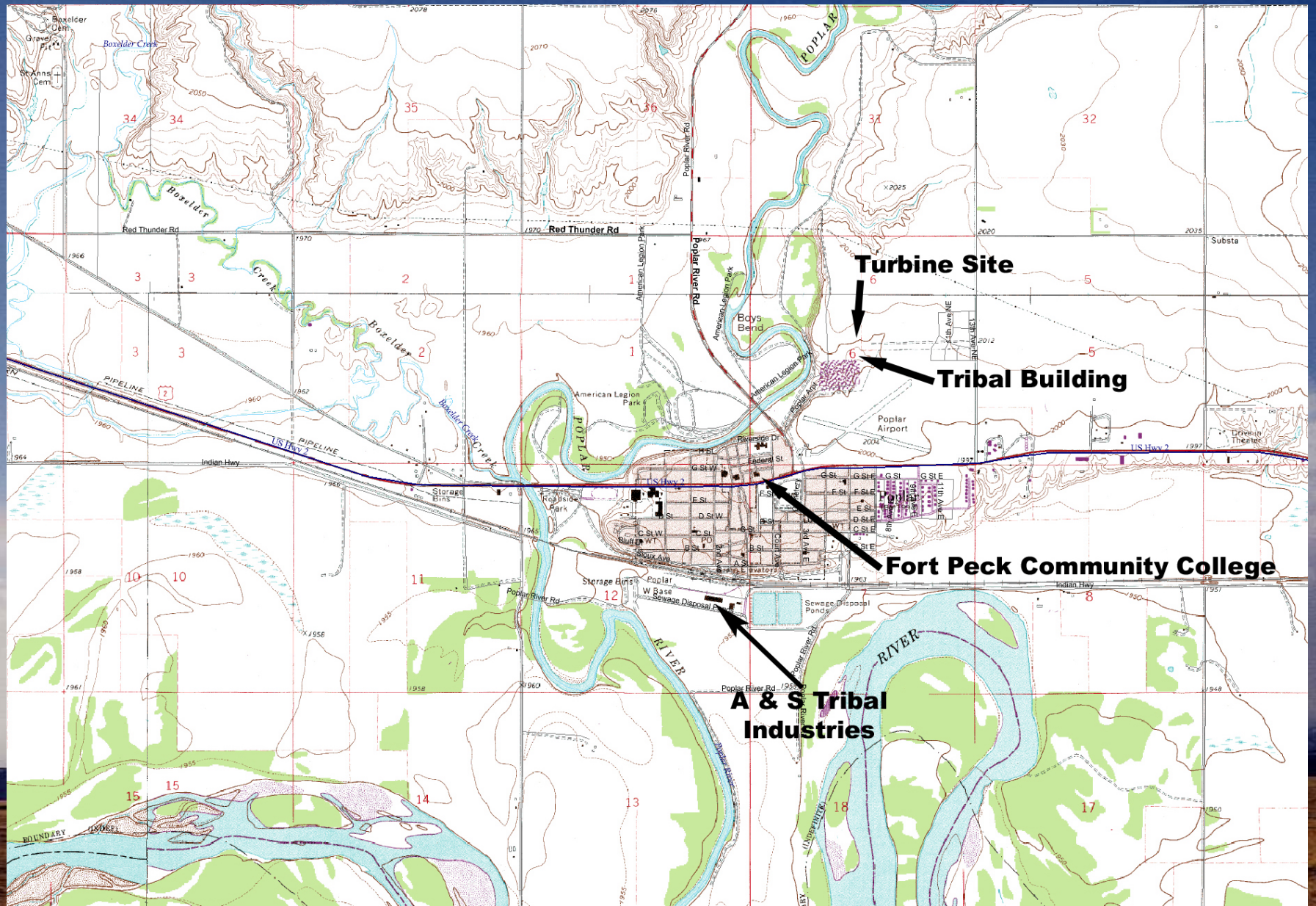
TrueWind Solutions



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



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PROJECT OVERVIEW

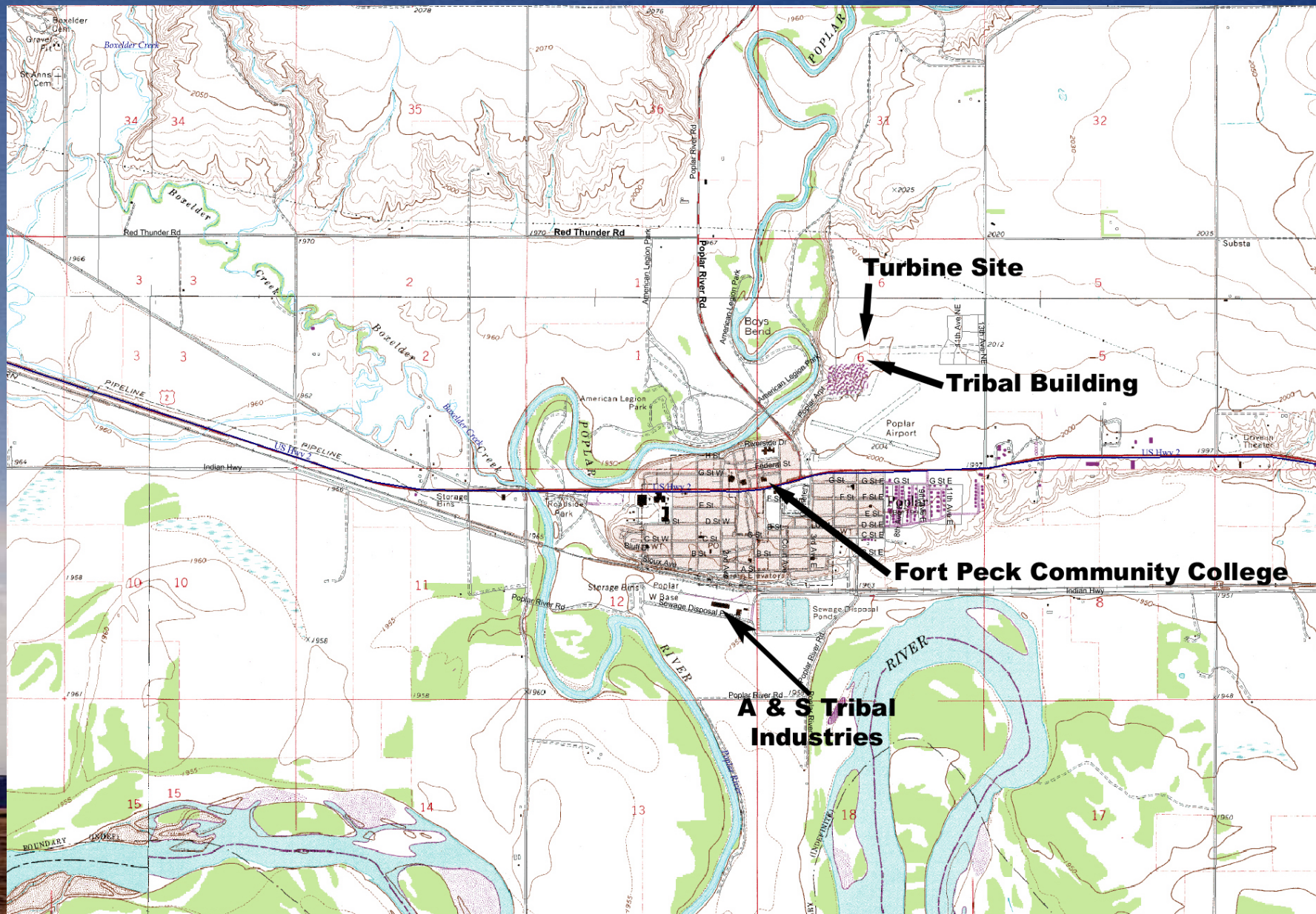
**Buy and Install a Vestas V47-660kw
Wind Turbine**

**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**





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Tribal Demographics for the Assiniboine Sioux Tribes at Fort Peck

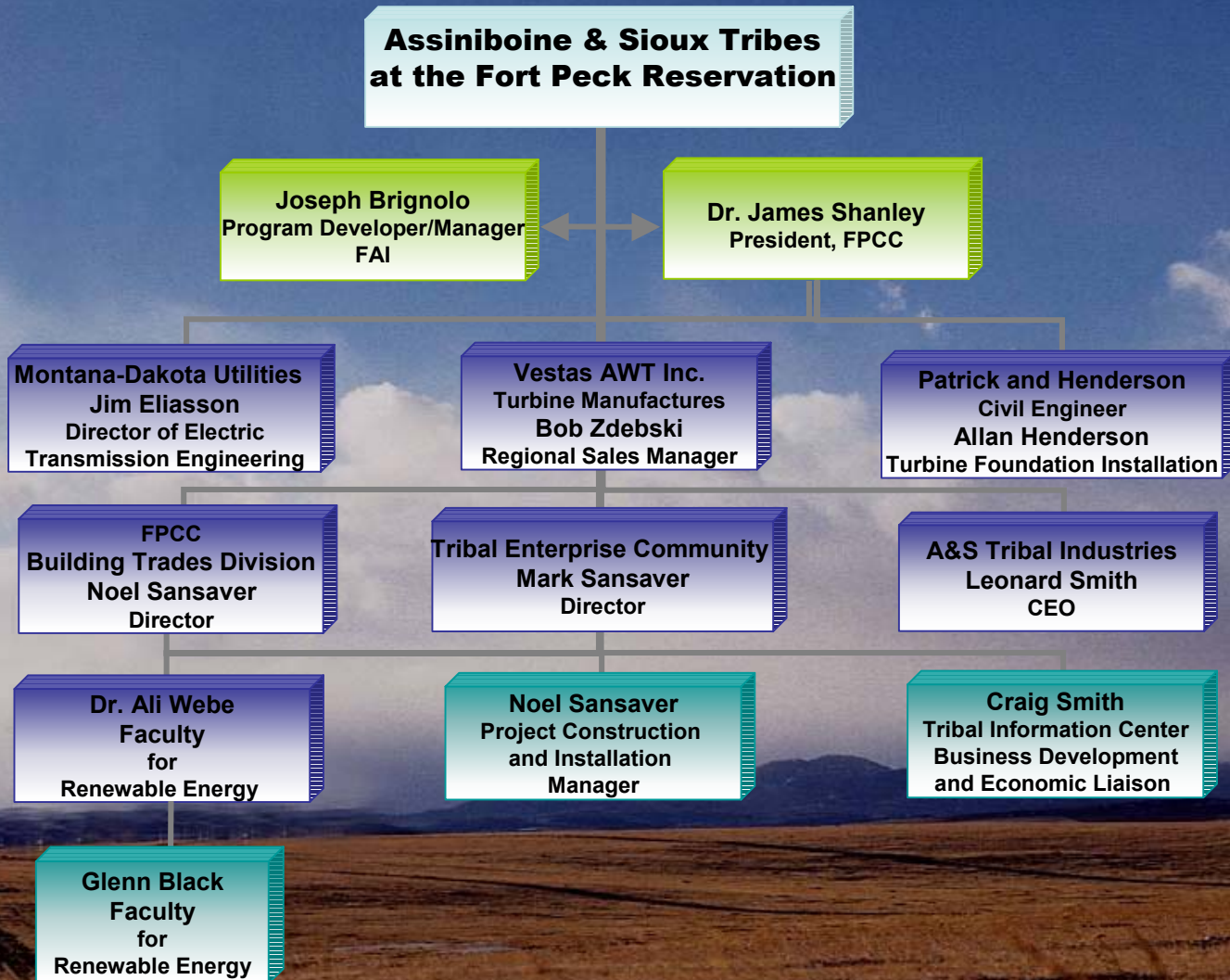
Total area	2,093,318 acres
Tribally owned	935,000 acres
High School graduate or higher	61.4%
Bachelor's deg. or higher	5.9%
Per capita income	\$4,778.00
Total labor force	2,003
Unemployment rate	76.0%
Total reservation population	10,722

PROJECT PARTICIPANTS

- **Department of Energy / NREL**
- **Fort Peck Community College**
- **Foundation for the American Indian**
- **Vestas American Wind Turbines**
- **Florida Power and Light Energy**
- **Patrick and Henderson**
- **Barnhart Crane and Rigging Company**
- **Montana-Dakota Utilities**
- **Roosevelt County**
- **Trucker's Express**

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Organizational Chart for Project



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**

< > Search Print zoom

Wind Turbine Power Calculator

Do not operate the form until this page and its programme have loaded completely.

CALCULATOR

Home

▶ Guided tour

- Introduction
- ▶ Wind
- ▶ Turbine siting
- ▶ 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

Site Data ?

Air Density Data
 °C temp at m altitude (= kPa pressure) kg/m³ ?

density
 Wind Distribution Data for Site
 Weibull shape parameter
 m/s mean = Weibull scale parameter ?

m height, Roughness length m = class ?

Wind Turbine Data kW

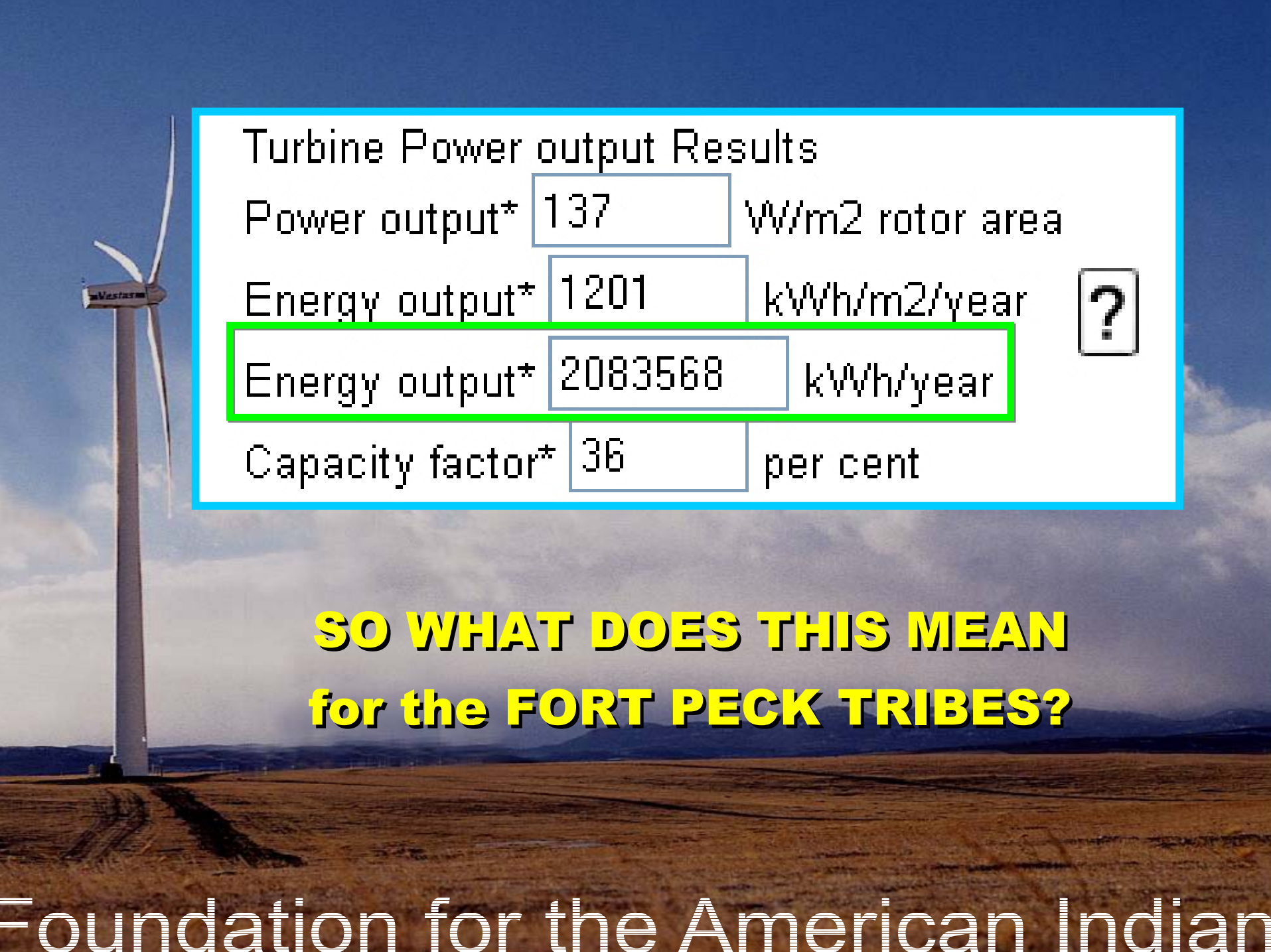
m/s cut in wind speed, m/s cut out wind speed ?

m rotor diameter, m hub height m ?

?

Site Power Input Results	Turbine Power output Results
Power input* 474 W/m ² rotor area	Power output* 137 W/m ² rotor area
Max. power input at* 11.8 m/s	Energy output* 1201 kWh/m ² /year ?
Mean hub ht wind speed* 7.4 m/s	Energy output* 2083568 kWh/year
	Capacity factor* 36 per cent

m/s... kW		Wind Turbine Power Curve		m/s... kW		
1	0	11	538	21	660	?
2	0	12	600	22	660	
3	0	13	635	23	660	
4	2.9	14	651	24	660	
5	43.8	15	657	25	660	
6	96.7	16	659	26	0	
7	166	17	660	27	0	
8	252	18	660	28	0	
9	350	19	660	29	0	
10	450	20	660	30	0	

A tall white wind turbine stands on a brown, grassy field under a blue sky with scattered clouds. The turbine has three blades and a small 'Vestas' logo on the nacelle. In the background, there are rolling hills and a few other distant turbines.

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?**

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Fort Peck Project

Energy output* 2083568 kWh/year

x 6.5 Cents per Kwh

= \$135,431.92 - Savings

Fort Peck Project

Energy output* 2083568 kWh/year

GREENTAGS...

x 2.0 Cents per Kwh

= \$ 41671.72 - **Income**

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RESULTS

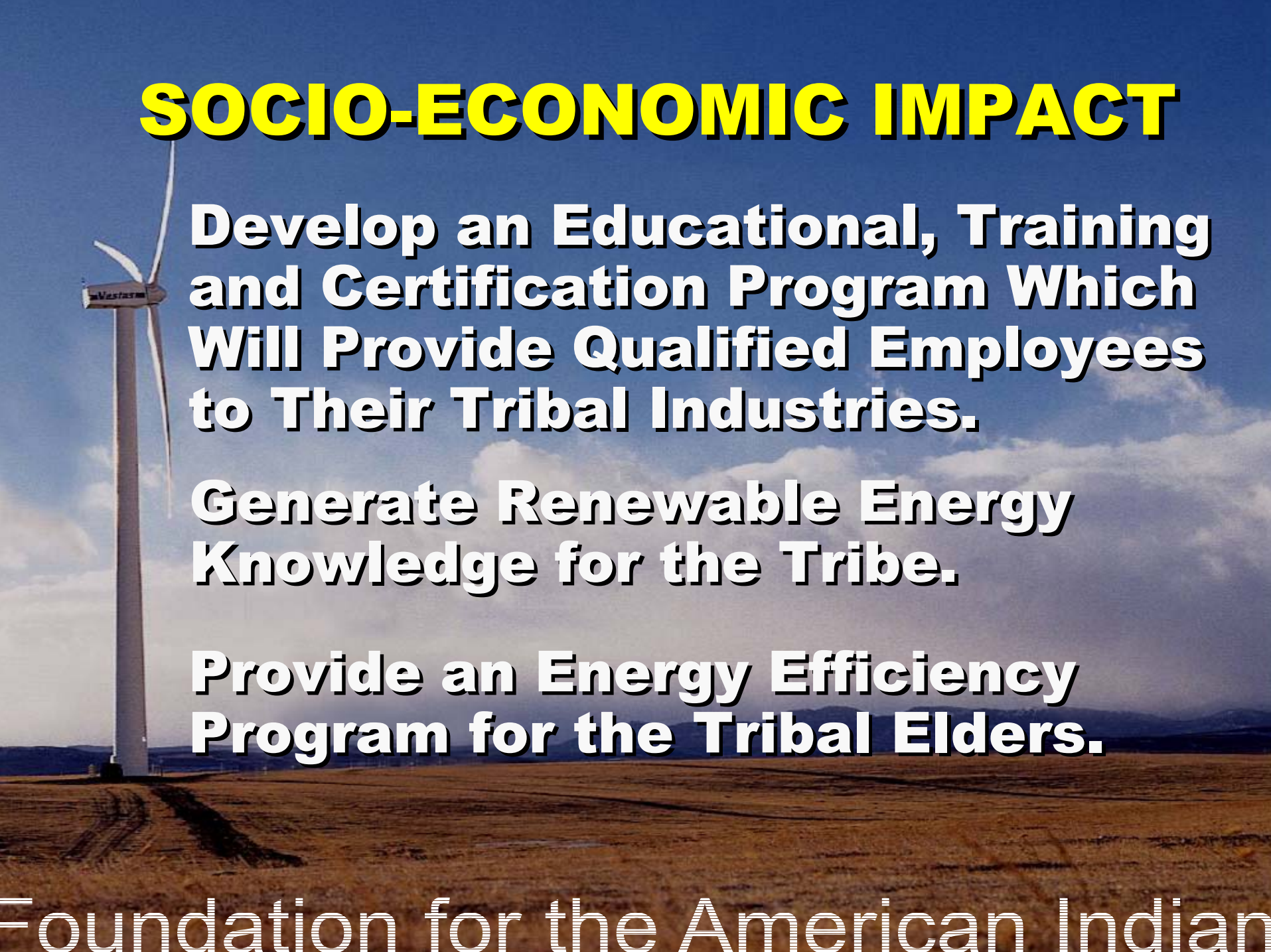
**The Assiniboine & Sioux Tribes
Will Save More than \$ 130,000
Annually on their Electricity...**

**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

A tall white wind turbine stands on a brown, dry field. The sky is blue with scattered white clouds. The turbine's blades are partially visible, and its tower extends from the ground to the top of the frame.

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.

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Accomplishments

Montana Dakota Utilities Has Committed Their Support to Net Meter 3 Tribal Buildings.

Florida Power and Light Energy Has Agreed to Sell the Project a Vestas V-47 660 for \$458,000.

Vestas Will Commission, Maintain a Service Contract, and Train Tribal Members to Operate and Maintain Their Turbine.

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Technical and Management Issues

- 
- A photograph of a wind turbine in a field under a blue sky with clouds. The turbine is on the left side of the image, and the text is overlaid on the right side.
- **NEPA Compliance**
 - **Soil Samples**
 - **Foundation Design**
 - **Weather Cooperation**
 - **Turbine Delivery and**
 - **Crane Schedule (Lifting/Rigging)**
 - **Interconnect**
 - **Socio-economic Programs**
 - **Web Site Development**

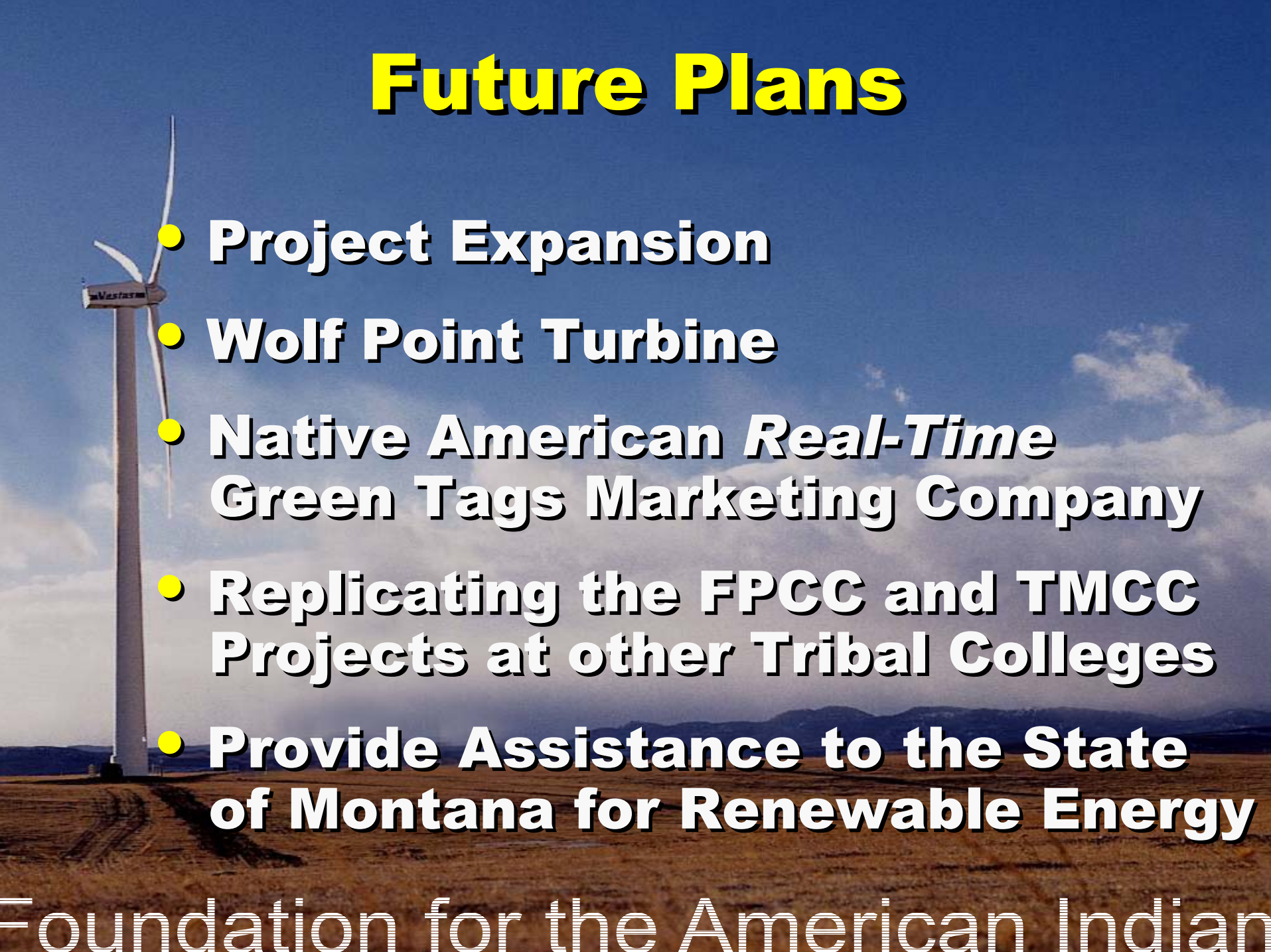
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Current and Future Activities

- 
- A photograph of a wind turbine in a field under a blue sky with clouds. The turbine is on the left side of the image, and the field is in the foreground. The sky is blue with some white clouds. The turbine has three blades and a tall tower. The field is brown and appears to be dry. The overall scene is a landscape with a wind turbine.
- **Permitting**
 - **Interconnect Agreement**
 - **“Green-e” Certification**
 - **Retail Sales of Green Tags**
 - **Renewable Energy Curriculum**
 - **Contract Negotiations**
 - **Web Site Development**

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Future Plans

- 
- A tall, white wind turbine stands in a dry, brown field under a bright blue sky with scattered white clouds. The turbine's blades are visible, and the ground shows tire tracks.
- **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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