



Ewiiaapaayp Wind Project

Tony Pinto



Ewiiaapaayp Members



Tlingit Tantakwaan Teikweidi



Yaan Yaan Eesh

Development Process

- Site Selection – topologically site specific
- Land Agreements – federal approval uncertainties
- Wind Assessment – long-term assessments necessary
- Environmental Review – TERA opportunity, perhaps
- Economic Modeling – increasing costs and prices
- Interconnection Studies – FERC issues
- Permitting – off-reservation issues
- PPA – imbalanced load commitment effect on pricing, Biomass-to-energy opportunities to improve PPA pricing
- Financing – financial risk
- Turbine Procurement – over 2-year provisioning delays
- Construction Contracting – increasing costs
- Operations & Maintenance – O&M opportunity for tribes

Site Selection

- Evidence of Significant Wind
- Average wind speeds of 7.4m/s - 15.5 m/s
- Average gross capacity factors 31% - 43%
- Proximity to Transmission Lines – SRPL??
- Reasonable Road Access – cut roads
- Environmental Issues – off-reservation issues
- Community Issues – transmission connections

East San Diego County Reservations





MOUNTAIN EMPIRE Community Planning Area

Draft Land Use Map - August 2008
This preliminary draft map is for informational purposes only and is subject to change.

- Village Residential (VR-28), 29 du/ac
- Village Residential (VR-24), 24 du/ac
- Village Residential (VR-20), 20 du/ac
- Village Residential (VR-14.5), 14.5 du/ac
- Village Residential (VR-10.9), 10.9 du/ac
- Village Residential (VR-7.3), 7.3 du/ac
- Village Residential (VR-4.3), 4.3 du/ac
- Village Residential (VR-2.9), 2.9 du/ac
- Village Residential (VR-2), 2 du/ac
- Semi-rural Residential (SR-1), 1 du/1,2.4 ac
- Semi-rural Residential (SR-2), 1 du/4,8.9 ac
- Semi-rural Residential (SR-4), 1 du/4,8.9 ac
- Semi-rural Residential (SR-10), 1 du/10,20 ac
- Rural Lands (RL-20), 1 du/20 ac
- Rural Lands (RL-40), 1 du/40 ac
- Rural Lands (RL-80), 1 du/80 ac
- Rural Lands (RL-160), 1 du/160 ac
- Specific Plan Area Ideline indicated in Italian
- Office Professional
- Neighborhood Commercial
- General Commercial
- Rural Commercial
- Limited Impact Industrial
- Medium Impact Industrial
- High Impact Industrial
- Village Core Mixed Use
- Public/Semi-Public Facilities
- National Forest and State Parks
- Tribal Land
- Open Space (Recreation)
- Open Space (Conservation)
- Military Installations
- Forest Conservation Initiative Overlay
- Area Subject to Further Refinements
- County Water Authority Boundary
- Mountain Empire Community Planning Area Boundary
- Adjacent Community Plan and Sponsor Group Boundary
- Jurisdictional Boundary

Regional Location Map



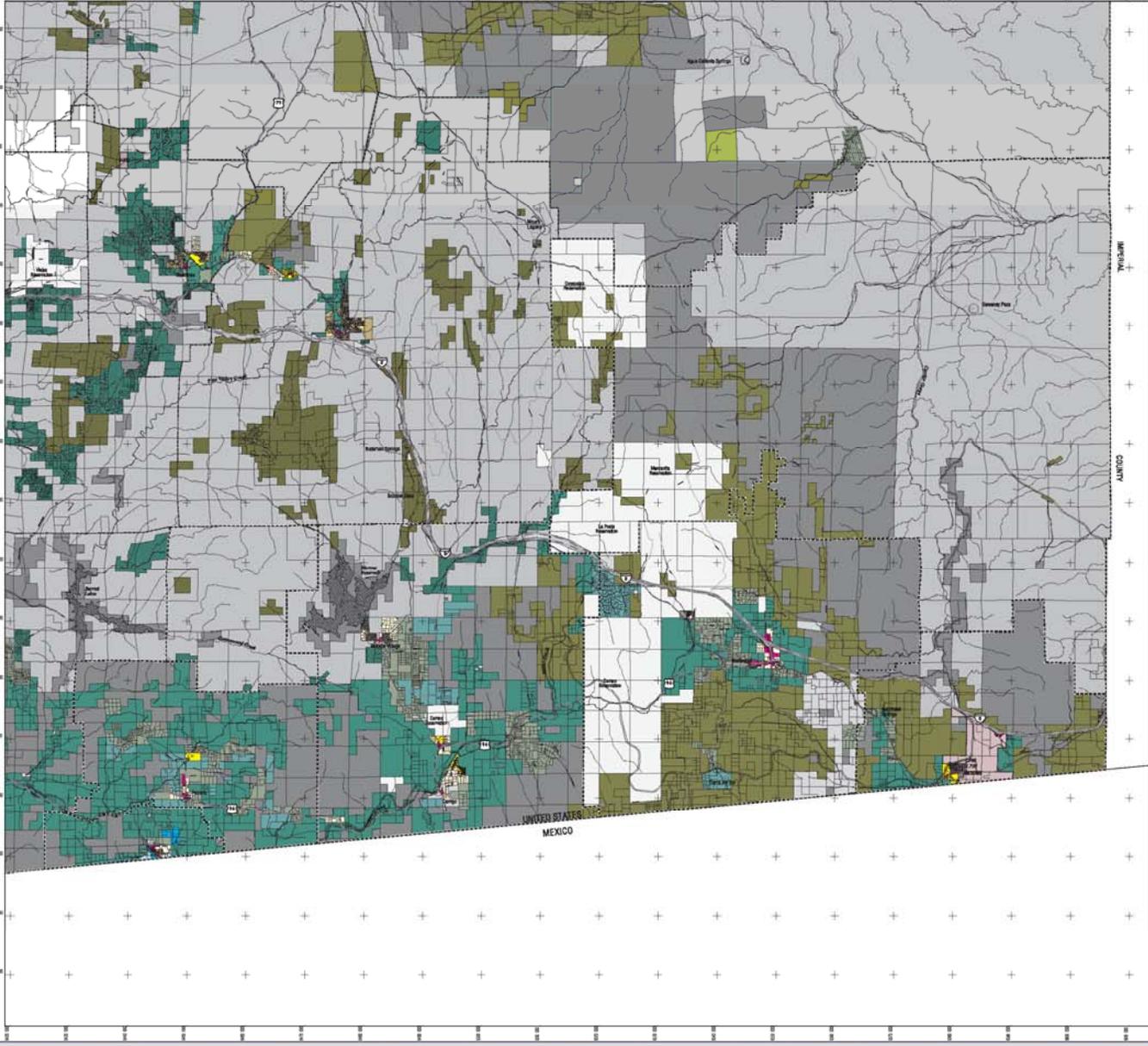
Map Prepared By:

Map Coordinates: StatePlane NAD83 Feet, Zone 12N

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640
Acres

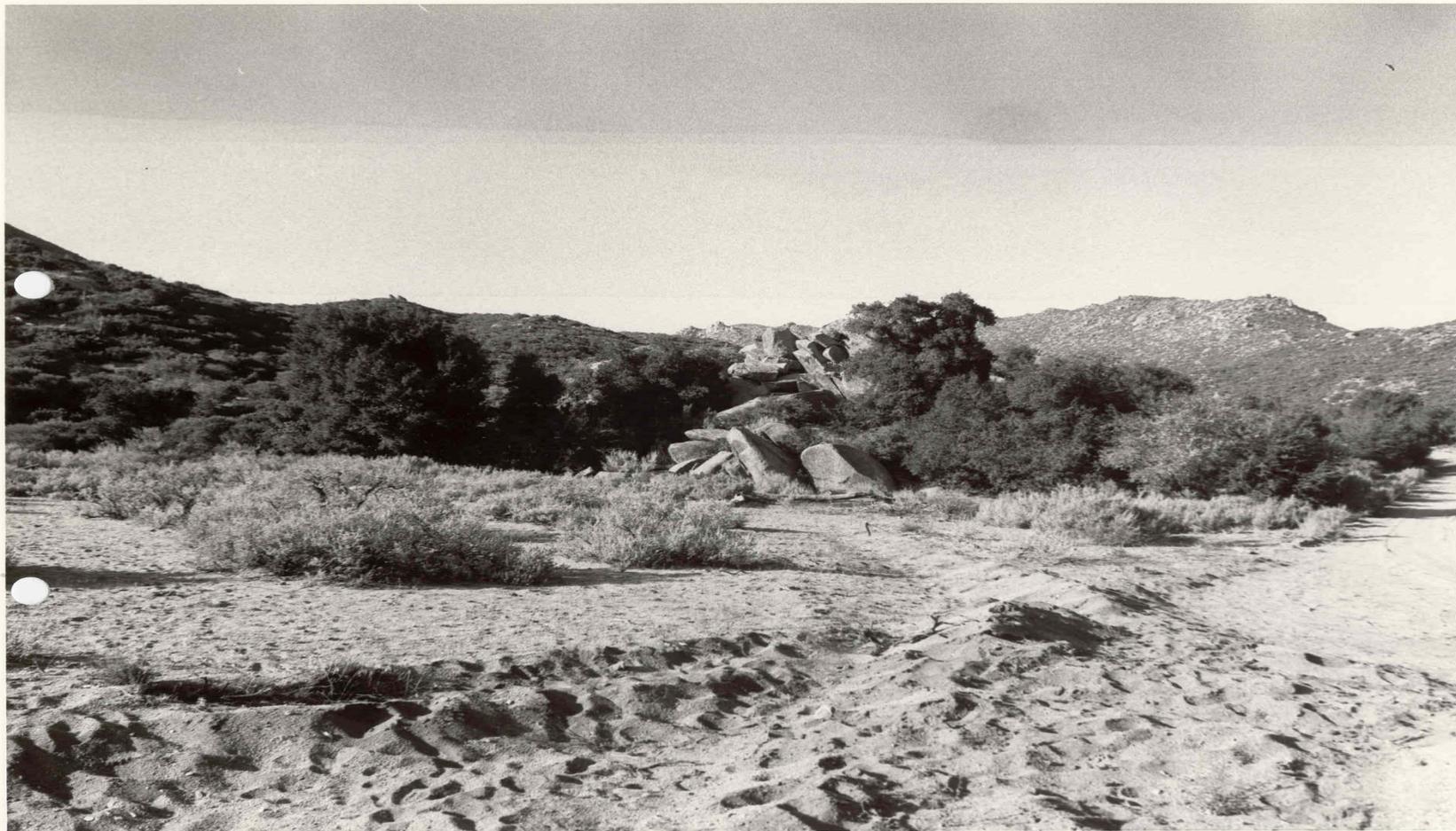
Scale: 1 inch = 640 feet
Printed 21 Sep 08



Ewiiaapaayp “Leaning Rock”



Valley



Ridges



ENE Ridge



West Ridge



East Ridge



Road to Res



Road to Res







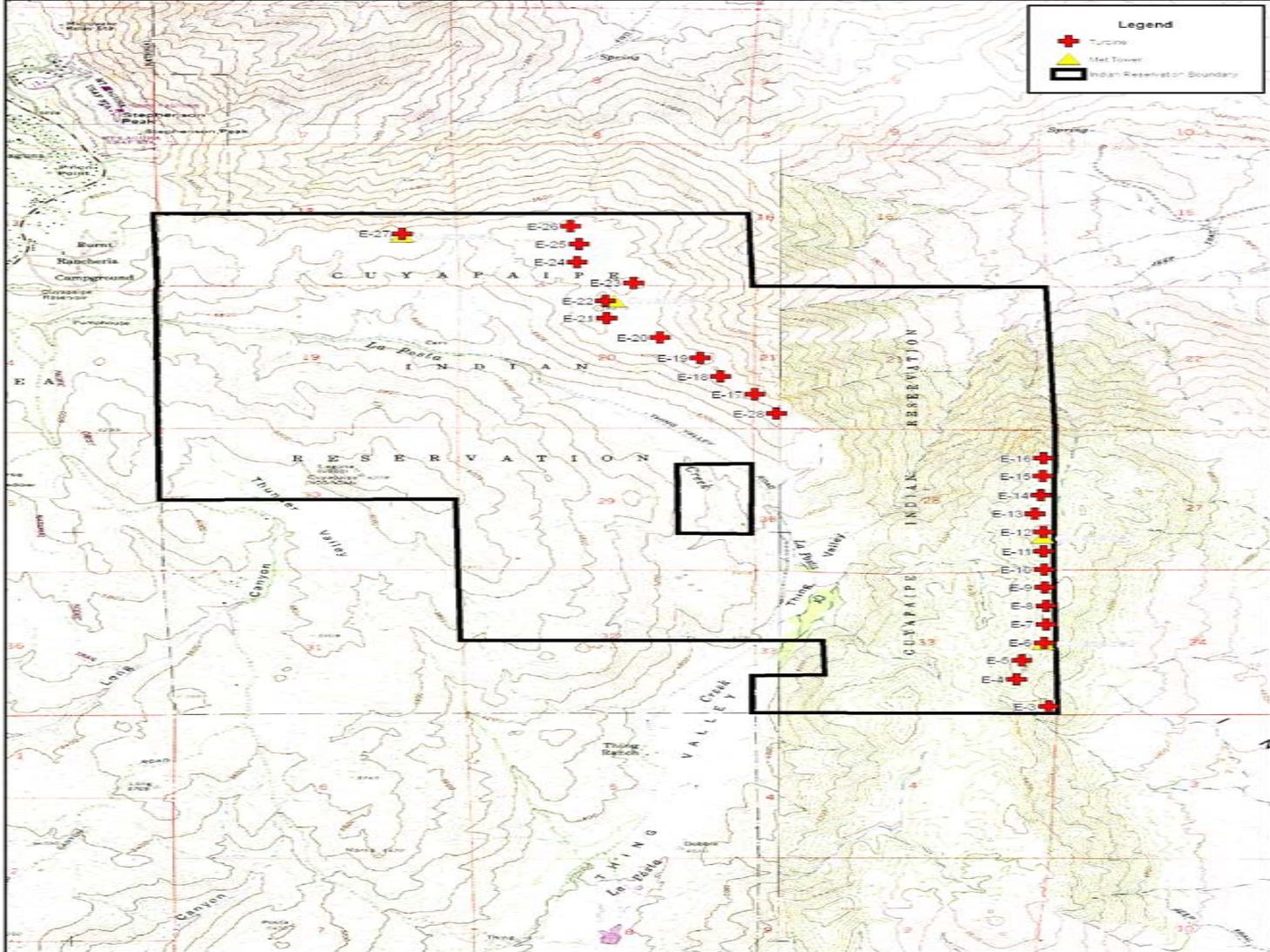


Superior Renewable Energy

Ewiiapaayp Preliminary Site Layout

Legend

- Turbine
- Met Tower
- Indian Reservation Boundary



0 0.2 0.4 0.8 Miles

Overview

- The ridgelines that could be developed generally lie at elevations ranging from 1680m to almost 1940m above sea level. At such high elevations, the air density is likely to average around 1.00 kg/m³ and less. Four meteorological towers were erected and recording wind data since 2004, and two met towers in 2007. The development area has extremely steep slopes and access is currently limited helicopter or by foot. The winds show to be predominately from the western sectors with a minority of winds from the northeast.

Wind Assessment

- Corollary Data: Kenetech, Canon, Superior
- Install Meteorological Towers
- Collect Data
- Minimum One Year of Data: Wind resource highly locational
- Wind Resource Study by Qualified Meteorologist
- Output Projections for Several Turbine Designs

Met Towers

- Two 50m meteorological towers were installed in February 2004. The data recovery was poor at first due to major icing events, and loggers destroyed by an electrical discharge caused by lightning strikes.

2004-2005 Assessment

- Calculations from the raw wind data as well as correlations among the towers show that the wind speeds at a hub height of 67m would range between 7.7 m/s and 8.2 m/s across the development area. This same data show that using the Gamesa G87, an efficient 2.0 MW Class II wind turbine, gross capacity factors would range between 34% and 36% on the north line, and gross capacity factors on the east line would range between 36% and 39%. The aggregate gross capacity across the ridgelines may be on the order of 34% to 37%.

Long-term Wind Assessment

- WindLogics model of the long-term wind resource based on the past 40 years with the aid of re-analysis data made available by the National Centers for Environmental Prediction and the National Center for Atmospheric Research show long-term wind speeds along the ridgeline at 67m range from 7.4 – 7.7 m/s. Gross capacity factor values range between 31% - 33%.

Normalized Monthly and Annual Wind Speed Averages

Normalized Monthly and Annual Wind Speed Averages (in m/s)

Kumeyaay - Cuyapaipe #1 - 67m

Kumeyaay - Cuyapaipe #2 - 67m

Month	67m
January	5.8
February	8.09
March	8.33
April	9.96
May	8.86
June	7.19
July	6.34
August	5.67
September	6.31
October	7.72
November	6.98
December	7.2
Annual Average	7.37

Month	67m
January	6.7
February	8.69
March	8.39
April	10.07
May	9.24
June	7.46
July	6.57
August	5.67
September	6.38
October	7.64
November	7.83
December	8.15
Annual Average	7.73

Wind speeds normalized to 40 years
All other data representative of modeled year

Normalized Monthly and Annual Gross Energy Production and Capacity Factor

Normalized Monthly and Annual Gross Energy Production and Capacity Factor (in kWh)

**Kumeyaay - Cuyapaibe #1 - 67m
Gamesa Eolica G87 2MW**

Height	67m		
Parameter	EP (kWh/mo)	CF	
January	336,089	23%	
February	486,958	35%	
March	519,489	35%	
April	695,454	48%	
May	571,294	38%	
June	472,083	33%	
July	402,373	27%	
August	301,606	20%	
September	344,584	24%	
October	427,840	29%	
November	421,882	29%	
December	434,560	29%	

	EP (kWh/yr)	CF	
Annual	5,414,213	31%	

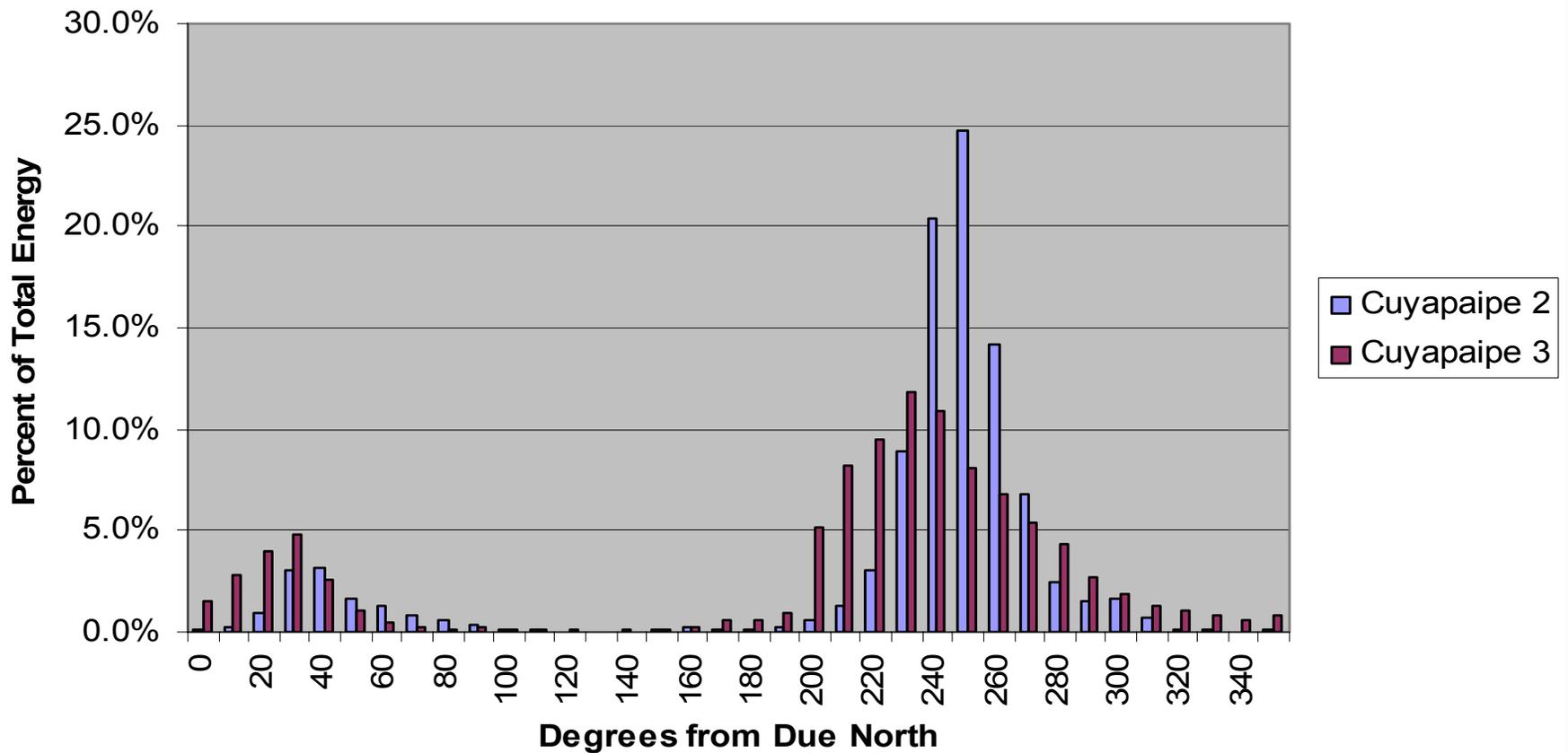
**Kumeyaay - Cuyapaibe #2 - 67m
Gamesa Eolica G87 2MW**

Height	67m		
Parameter	EP (kWh/mo)	CF	
January	419,288	28%	
February	536,957	39%	
March	558,058	38%	
April	716,879	50%	
May	611,077	41%	
June	489,990	34%	
July	402,708	27%	
August	280,988	19%	
September	341,747	24%	
October	453,739	30%	
November	501,035	35%	
December	518,928	35%	

	EP (kWh/yr)	CF	
Annual	5,831,394	33%	

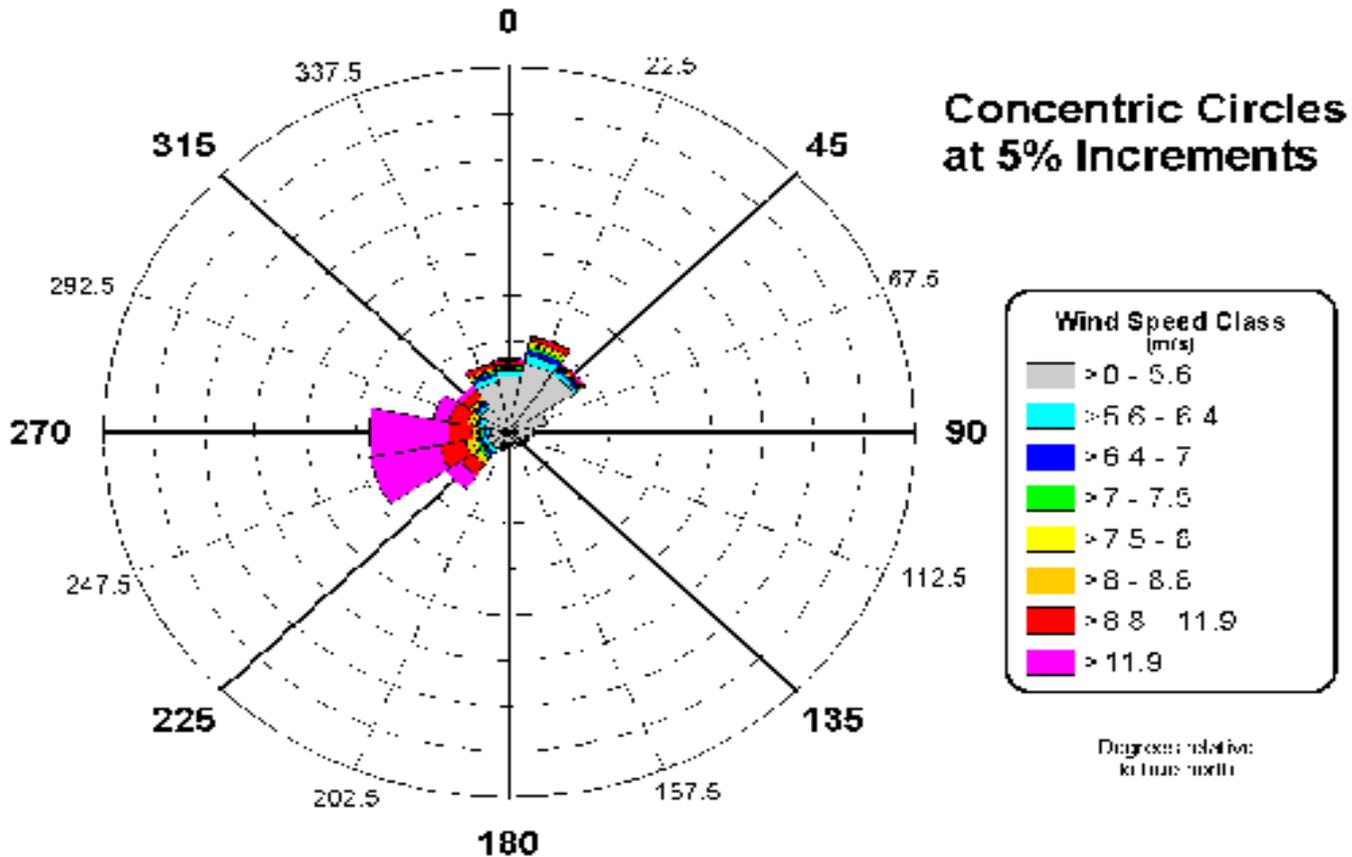
Energy Rose

Energy Rose



Wind Rose #1

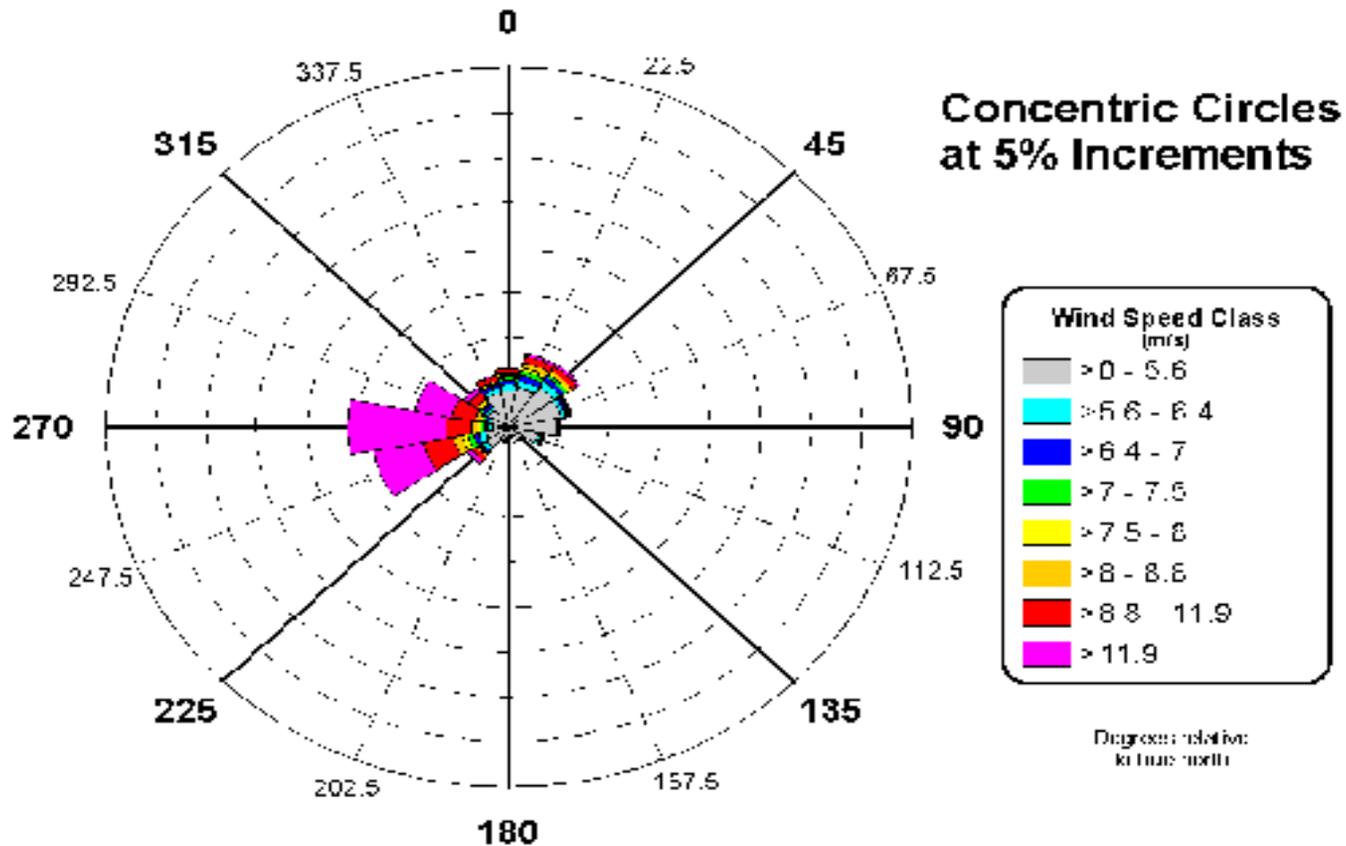
Normalized Wind Speed/Direction Occurrences - Wind Rose (in %)
Kumeyaay - Cuyapaibe #1 - 67m
Annual



Wind speeds normalized to 40 years
All other data representative of modeled year

Wind Rose #2

Normalized Wind Speed/Direction Occurrences - Wind Rose (in %)
Kumeyaay - Cuyapaibe #2 - 67m
Annual



Wind speeds normalized to 40 years
All other data representative of modeled year

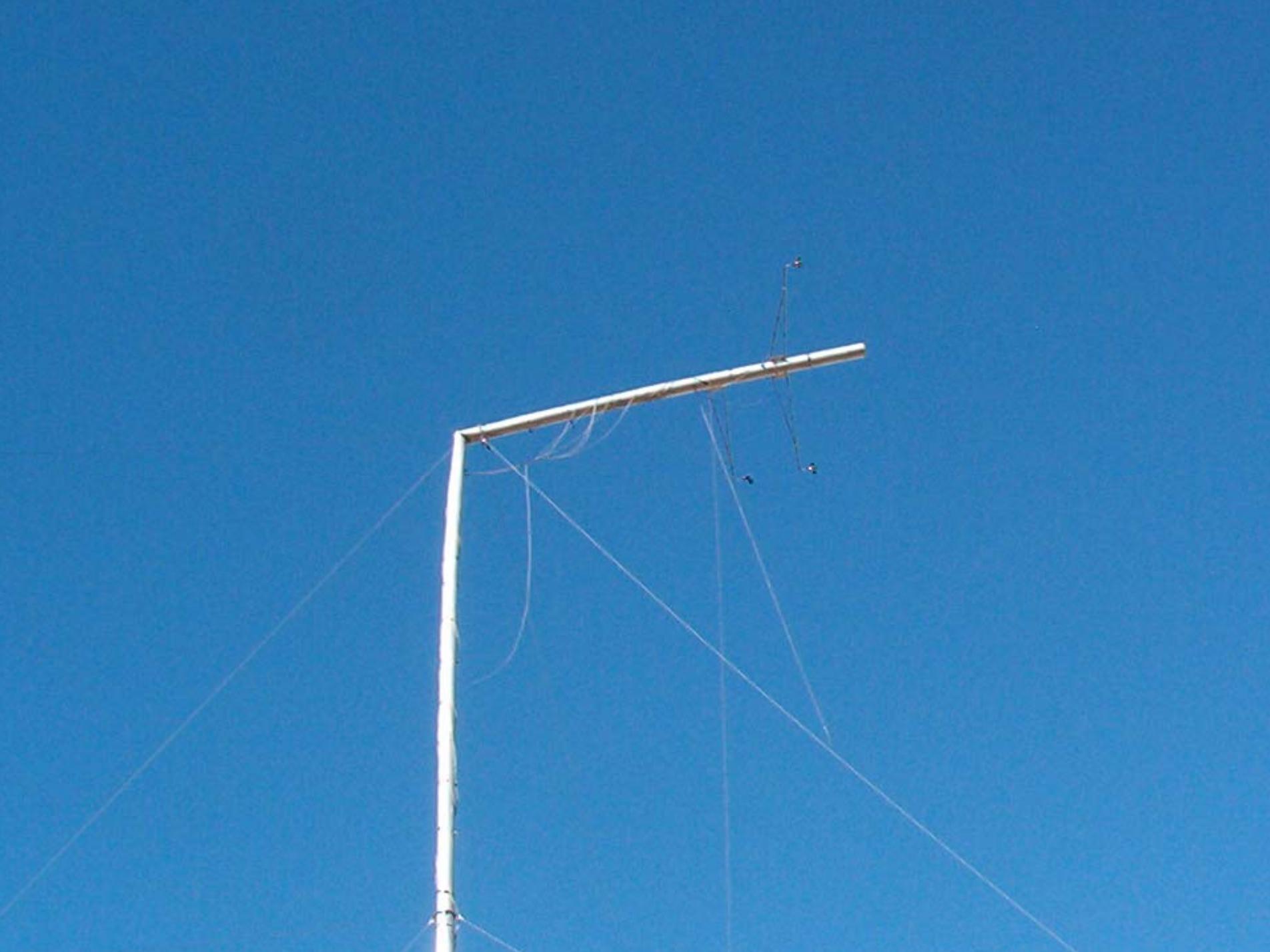
2007 Data Capture Project

- Data Capture Project. The study requires the installation and maintenance of two (2) NRG 50m HD meteorological (met) towers to record data for heavy icing events, electrical discharge caused by lightning strikes, and recording wind speeds at the 10m, 30m and 50m levels, particularly during 25 m/s wind speed events. The meteorological tower data study is needed due to the extreme and frequent icing experienced at the site during the winter inhibited an accurate resource assessment during a previous study. Such icing may prove to be a significant productivity loss to any array. There is also a significant frequency of extreme wind events exceeding 25 m/s.

Sensors

- The new sensors to be placed on-site shall contain an extra battery source to power ice-free sensors. The cups on these anemometers should be heated, preventing ice build-up and loss of data. The levels should be adequate to capture the high wind gusts and 10-min intervals in excess of 25m/s. Typically, when the winds are blowing this fast at the site (and most sites) the wind shear is relatively low and all levels tend to experience the same high winds.

- Task 1. Meteorological Tower Rental and Installation
- The Tribe shall compete and award a contract for rental, installation, maintenance and data monitoring of two (2) meteorological towers to collect data pursuant to Project #1 of the Tribe's Study. The successful vendor shall install the two (2) NRG 50m HD meteorological towers with extra battery packs.
- Task 2. Meteorological Tower Maintenance and Data Monitoring
- The successful vendor shall maintain the two (2) meteorological towers and monitor and record the towers' transmitted data.
- Task 3. Meteorological Tower Data Study
- The successful vendor shall complete (or award a subcontract to a third party, with the approval of the Tribe) a study of the data collected by the two (2) meteorological towers. The successful vendor shall complete the study.
- Task 4. Updated Resource Assessment
- The successful vendor shall complete (or award a subcontract to a third party, with the approval of the Tribe) an updated wind resource assessment using the data study from the two (2) meteorological towers. The successful vendor shall complete the study.
- Updated Resource Assessment – Scope of Work:
- 1. Electronic Data Files (CD enclosed).
- Electronic files containing hourly average wind speed for meteorological data collected on the Ewiiapaayp and Campo location (file name - Kumeyaay met data)
- Electronic file containing wind rose and distribution data (file name - Kumeyaay met data)
- Electronic file containing the G87 power curve (file name - Power curve G87 60 Hz 2 MW)
- 2. Information.
- Use Gamesa 2 MW 87 m rotor diameter (G87) wind turbine generators for the Study.
- 3. Deliverables - Calculations.
- Although there exists less than one year of data on the Ewiiapaayp Indian Reservation location, the data supplied should enable a 3rd party to make the following calculations:
- Estimate the gross annual energy production utilizing the wind speed data and G87 power curve;
- Estimate the wake and turbulence losses from the wind rose and distribution analysis to achieve a net estimate of production taking into consideration a standard total electrical loss of 2%;



Kumeyaay Wind Project







Environmental Review

- Endangered Species Review
- Avian Studies
- Raptors
- Migratory Birds
- Review with Interested Parties
- Prepare, Conduct, and Report Studies as Required

NEPA

Live Indians vs. Dead Indians (and other creatures)



TERA, TERA, TERA

- TEDC
- TERA Regulations Published
- TERA Plan Approved by DOI

Land Lease Agreement

- Term: Expected Life of the Turbine
- Rights: Water, ROW & Easements, Transmission
- Compensation: Percentage of Revenues (Royalty) plus minimum payment per turbine
- Assignable: financing requirement
- Indemnification
- Reclamation Provision

Environmental Review

- Visual Studies
- Photo Simulation, multiple views and distances
- Review with Local Authorities
- Historical and Archeological Review
- Prepare, Conduct, and Report Studies as Required
- Review with Interested Parties
- Wetlands Review

Economic Modeling

- Obtain Key Data
- Output Projections
- Turbines, Blades, Electronics and Tower Costs
- Balance of Plant Costs
- Foundation, Padmount Transformer, Collection System, Cables, Erections, Substation, Communication and Control Systems

Cuyapaibe Projected Revenue Streams

Turbine: Gamesa G87, 2000kW, 67m Hub, 87m Rotor

Project Size: 50 Megawatts, 25 Turbines

	2005	2006	2007	2008	2009
Year	1	2	3	4	5
Energy Sales Revenue Calculation					
Net Output / Turbine	5,022,900	5,022,900	5,022,900	5,022,900	5,022,900
# of Turbines	25	25	25	25	25
Project Net Output (MWh)	125,573	125,573	125,573	125,573	125,573
Scenario #1 Contract with PTC Inflator					
Power Price (\$/MWh)	49.00	49.75	50.50	51.50	51.75
Energy Sales Revenue	6,153,053	6,247,232	6,341,411	6,466,984	6,498,377
Tribe's Royalty @ 4%	<u>246,122</u>	<u>249,889</u>	<u>253,656</u>	<u>258,679</u>	<u>259,935</u>
Net Present Value of Tribe's Royalty @ 9% Discount	<u>\$2,345,984</u>				
Scenario #2 Contract without PTC Inflator					
Power Price (\$/MWh)	49.75	50.50	51.25	52.25	52.50
Energy Sales Revenue	6,247,232	6,341,411	6,435,591	6,561,163	6,592,558
Tribe's Royalty @ 4%	<u>249,889</u>	<u>253,656</u>	<u>257,424</u>	<u>262,447</u>	<u>263,702</u>
Net Present Value of Tribe's Royalty @ 9% Discount	<u>\$2,380,352</u>				

Economic Modeling

- Taxes: Possessory Interest Tax, Production Tax Credit, Green Tags, White Tags, Accelerated Depreciation Schedule, FUTA Credit.
- O&M Estimates
- Finance Assumptions: Principle, Interest Rate, Fees, Loan vs. Bond, Covenants, Restrictions, Term, IRR, Equity Rate of Return, Debt/Equity Ratio.

■ **A Partnership of ANCSA Native Regional Corporations and High Net-Worth Tribes**

■ (a) Direct Investors: ANCSA Native Alaskan Regional Corporations. ANCSA corporations, as a taxable entity, participate in tribal renewable energy projects by:

■ (i) investment.

■ to earn:

■ (ii) revenues from:

■ (1) Independent Power Producer energy sales;

■ (2) tax credits, applied to tax liabilities, from:

■ (3) employment of ANCSA construction and environmental firms.

■ (b) Pass Through Investors: High Net-Worth Tribes. High net-worth tribes, as non-taxable entities, participate in tribal renewable energy projects by:

■ guarantee of ANCSA investment, thereby reducing the cost of debt for the ANCSA corporations and receiving a fee for the risk premium;

■ guarantee of non-guaranteed portion (10%) of federally guaranteed loans of ANCSA corporations or tribes, and, as above, receiving a risk premium fee.

■ direct investment in projects;

■ re-investment/re-financing/buyout in Proven Developing Producing (PDP) projects upon expiration of energy credits.

■ (c) Syndication of Debt. Investment debt could be syndicated in two ways, as follows:

■ Both direct investors (ANCSA Native Corporations) and pass-through investors (high net-worth tribes) could syndicate their investment and debt by forming tribal private equity funds to place investments and leverage debt; and

■ other tribes could invest in the tribal private equity funds to earn dividends (other tribe private equity investment would replace a portion of project debt).

■ EPA of 2005 and TERA. The Partnership would participate in and benefit from the Energy Policy Act of 2005 Title V Tribal Energy Program (TERA) through its tribe-to-tribe investments.

■ Aggregation. The Partnership would aggregate the renewable energy tax credits benefits of the tribal renewable energy projects derived from multiple tribal energy projects, without regard to geographical location.