Ewiiaapaayp Wind Project

Tony Pinto

Ewiiaapaayp Members

Tlingit Tantakwaan Teikweidi

Yaan Yaan Eesh

Kaats Hit


KETCHIKAN
ALASKA
BEWARE: moose dropping


KETCHIKAN CREEK
221


WATER-WHEEL, KETCHIKAN CREEK, ALASKA.
218

Development Process

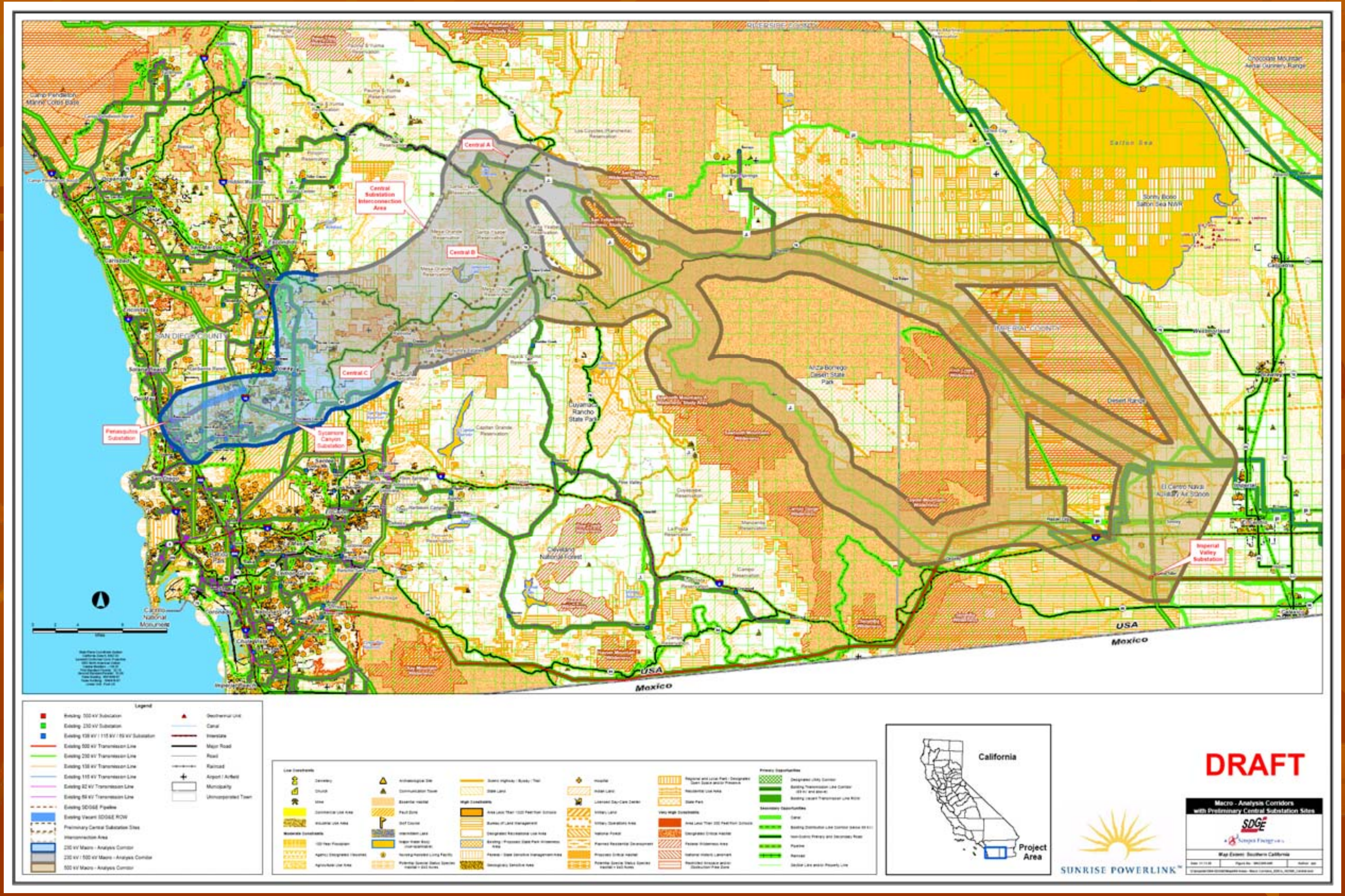
- Site Selection – topologically site specific
- Land Agreements – federal approval uncertainties
- Wind Assessment – long-term assessments necessary
- Environmental Review – TERA opportunity, perhaps
- Economic Modeling – increasing costs and prices
- Interconnection Studies – FERC issues
- Permitting – 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

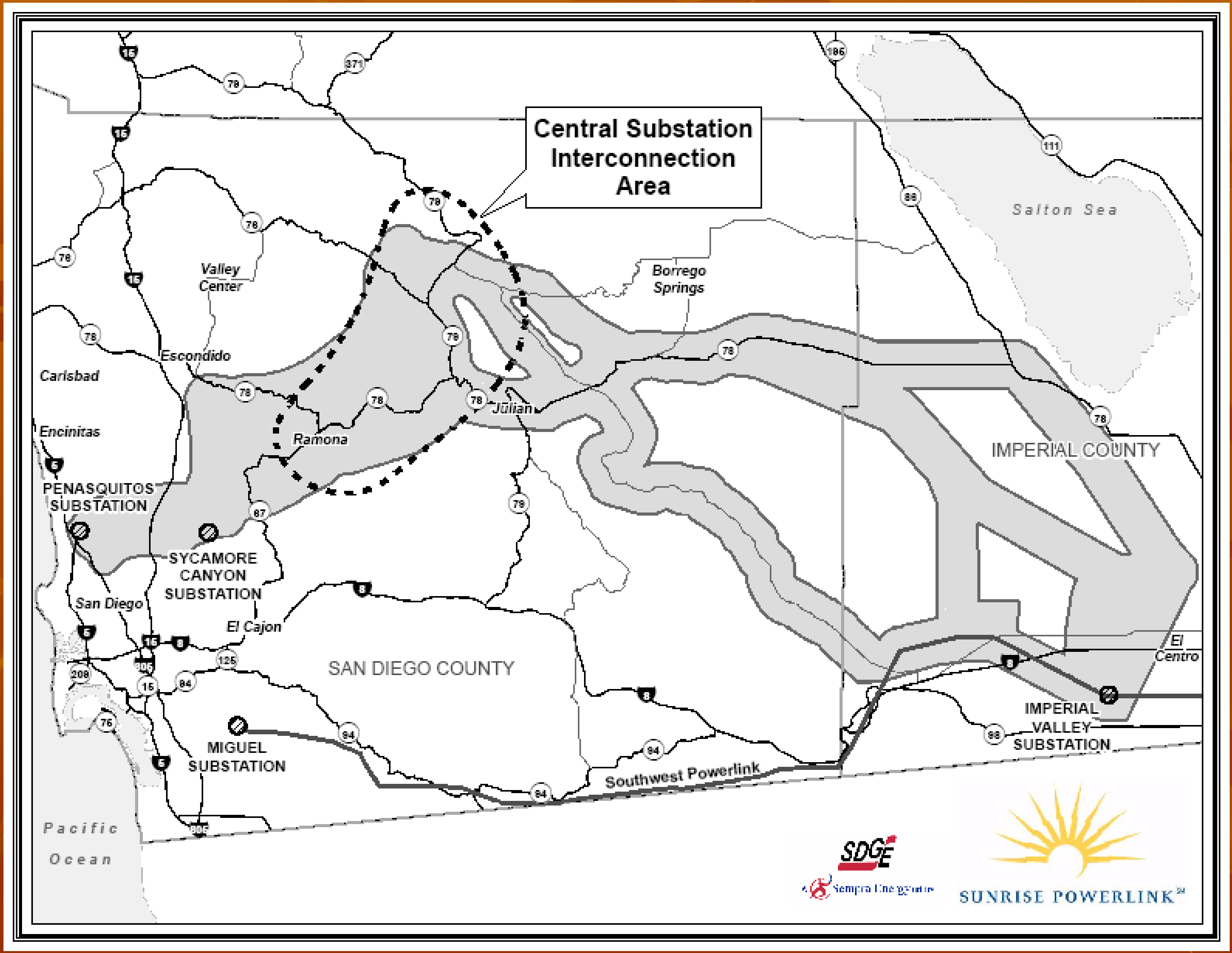
Site Selection

- 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

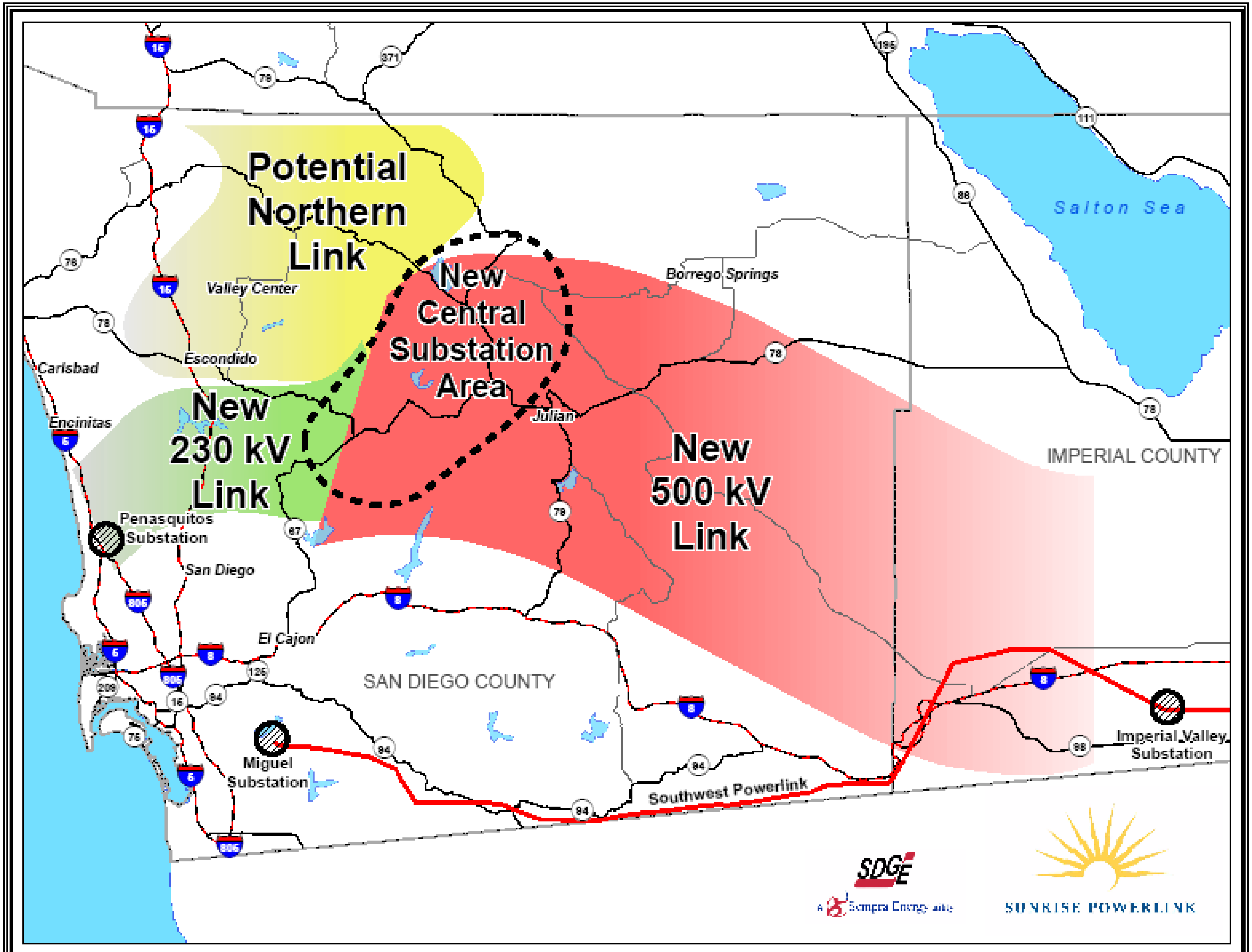
East San Diego County Reservations

Sunrise Powerlink



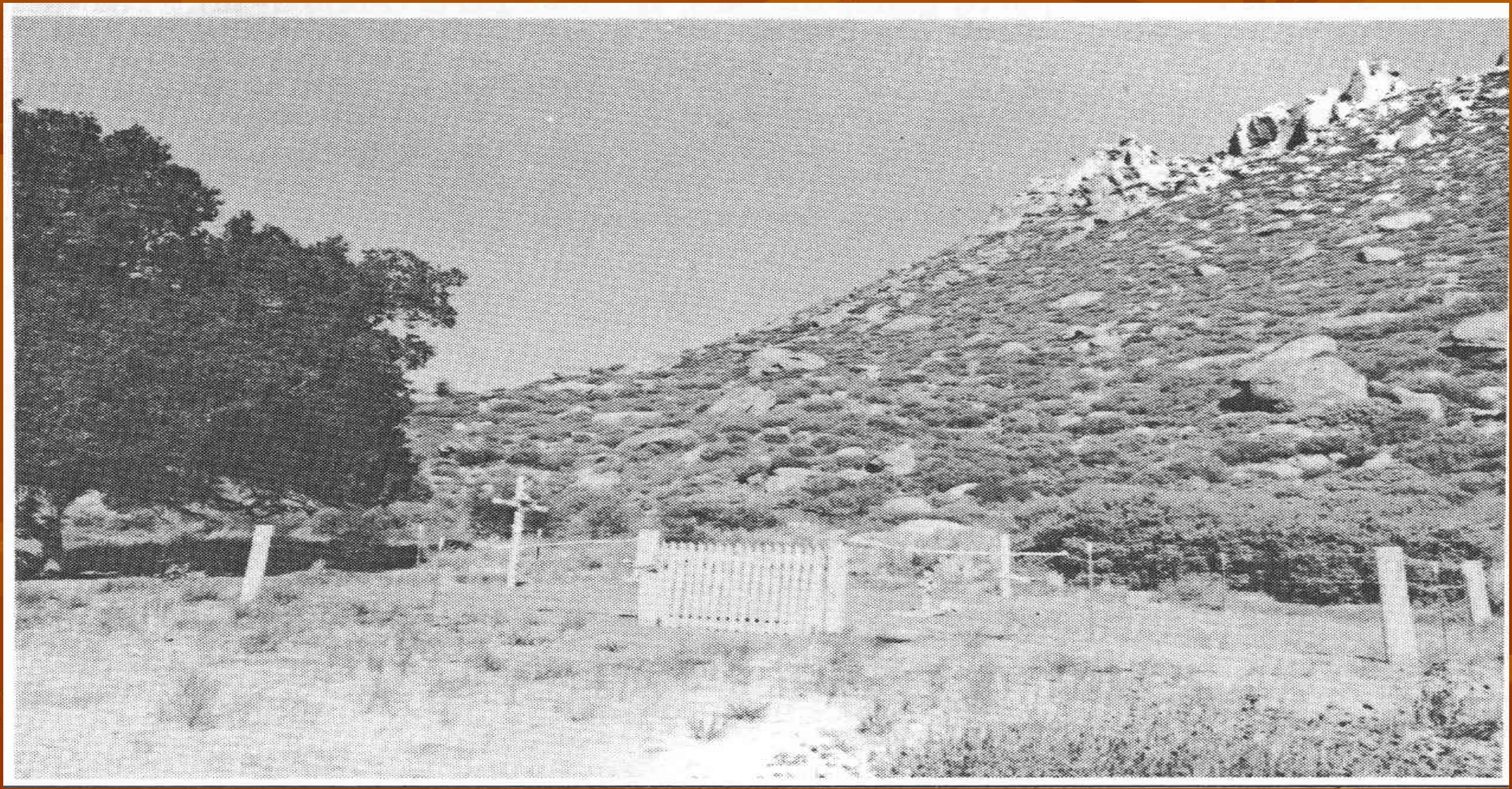


Central Substation Interconnection Area
Salton Sea
Borrego Springs
Valley Center
Escondido
Carlsbad
Encinitas
Ramona
Julian
IMPERIAL COUNTY
PENASQUITOS SUBSTATION
SYCAMORE CANYON SUBSTATION
San Diego
El Cajon
SAN DIEGO COUNTY
El Centro
IMPERIAL VALLEY SUBSTATION
MIGUEL SUBSTATION
Southwest Powerlink
Pacific Ocean
SDGE
SUNRISE POWERLINK

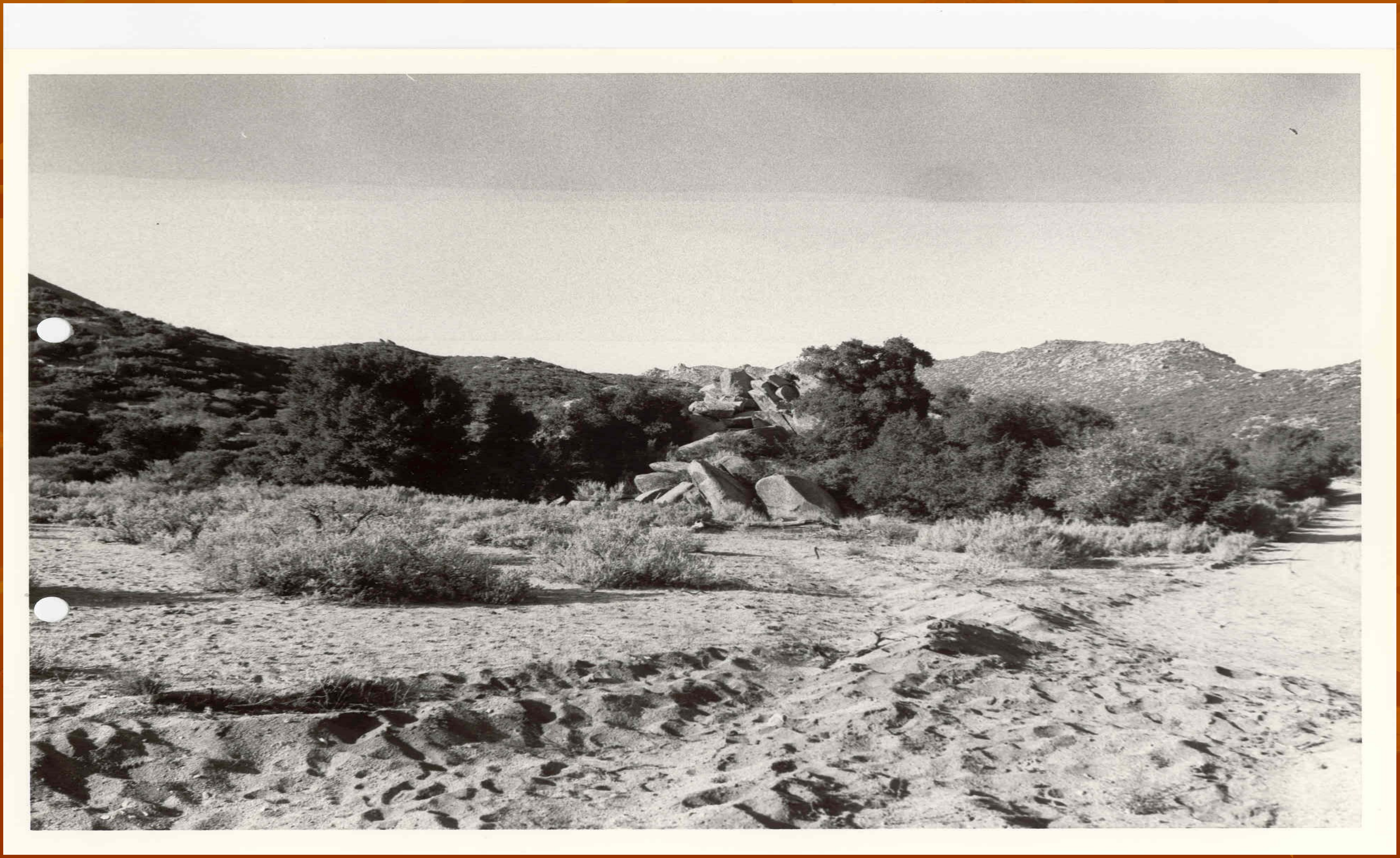


Potential Northern Link
New Central Substation Area
New 230 kV Link
New 500 kV Link
Salton Sea
Borrego Springs
Valley Center
Escondido
Carlsbad
Encinitas
Julian
IMPERIAL COUNTY
Penasquitos Substation
San Diego
El Cajon
SAN DIEGO COUNTY
Miguel Substation
Southwest Powerlink
Imperial Valley Substation
SDG&E
A Sempra Energy utility
SUNRISE POWERLINK

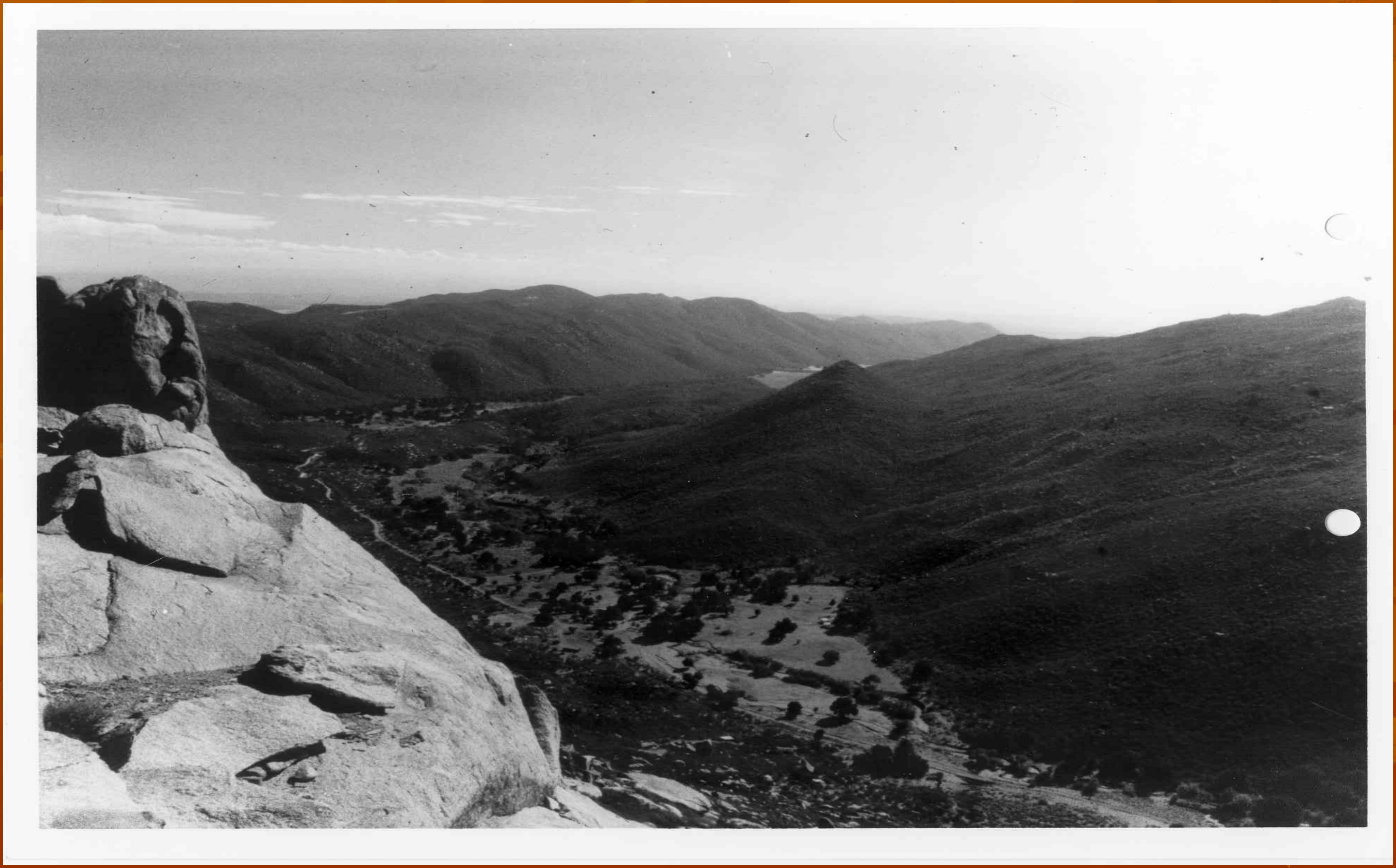
Ewiiaapaayp
"Leaning Rock"



Valley



Ridges



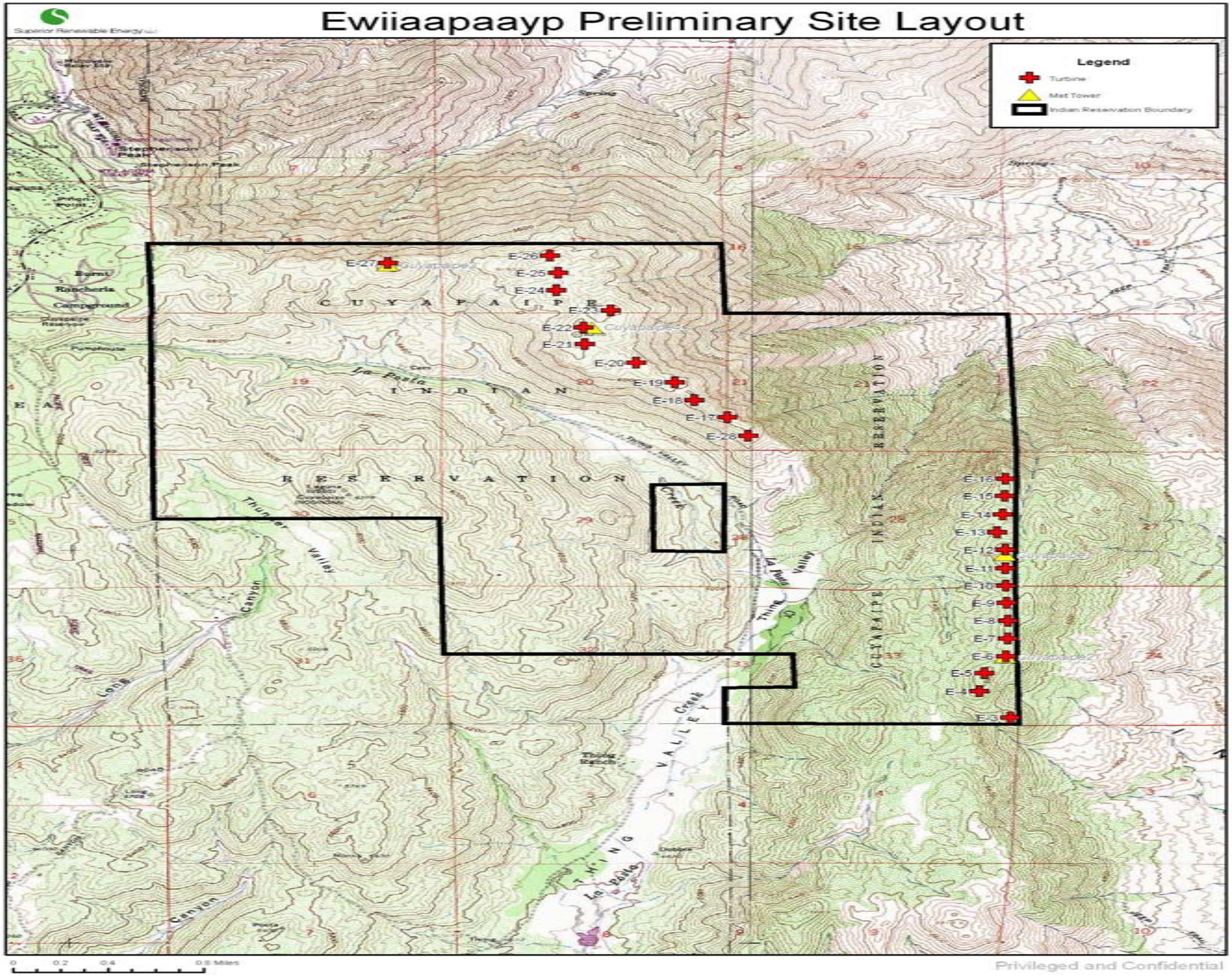
ENE Ridge

West Ridge

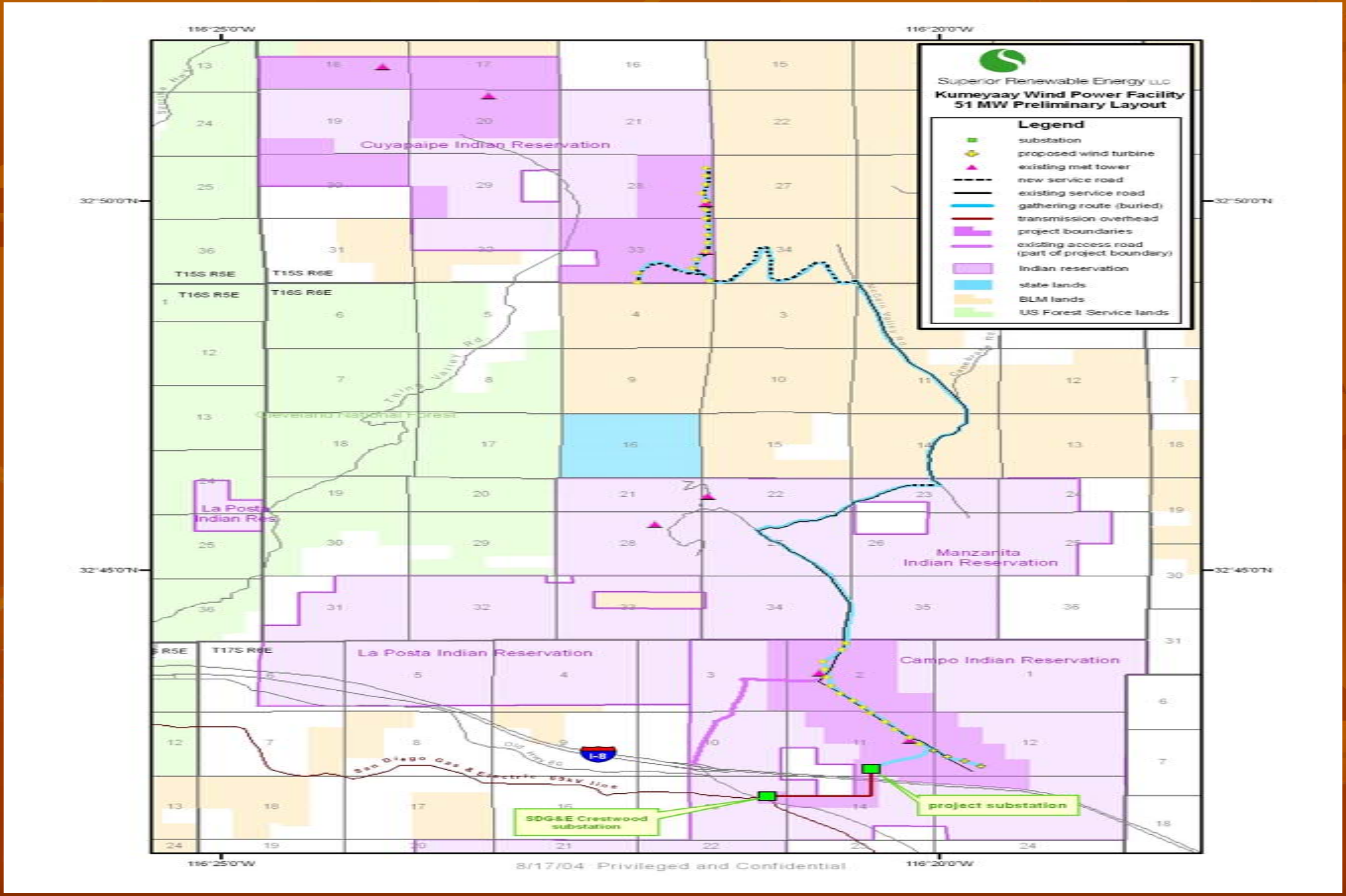
East Ridge

Road to Res

Road to Res


Ewiiaapaayp Preliminary Site Layout
Superior Renewable Energy
Legend
Turbine
Met Tower
Indian Reservation Boundary
E-27
E-26
E-25
E-24
E-23
E-22
E-21
E-20
E-19
E-18
E-17
E-28
E-16
E-15
E-14
E-13
E-12
E-11
E-10
E-9
E-8
E-7
E-6
E-5
E-4
E-3
C U Y A P A I P E
I N D I A N
R E S E R V A T I O N
Thing Valley
Privileged and Confidential

74 MW Transmission Lines



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
- 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 39% and 36%. 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	Month	67m
January	5.8	January	6.7
February	8.09	February	8.69
March	8.33	March	8.39
April	9.96	April	10.07
May	8.86	May	9.24
June	7.19	June	7.46
July	6.34	July	6.57
August	5.67	August	5.67
September	6.31	September	6.38
October	7.72	October	7.64
November	6.98	November	7.83
December	7.2	December	8.15
Annual Average	7.37	Annual Average	7.73

Wind speeds normalized to 40 years

All other data represetative 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)

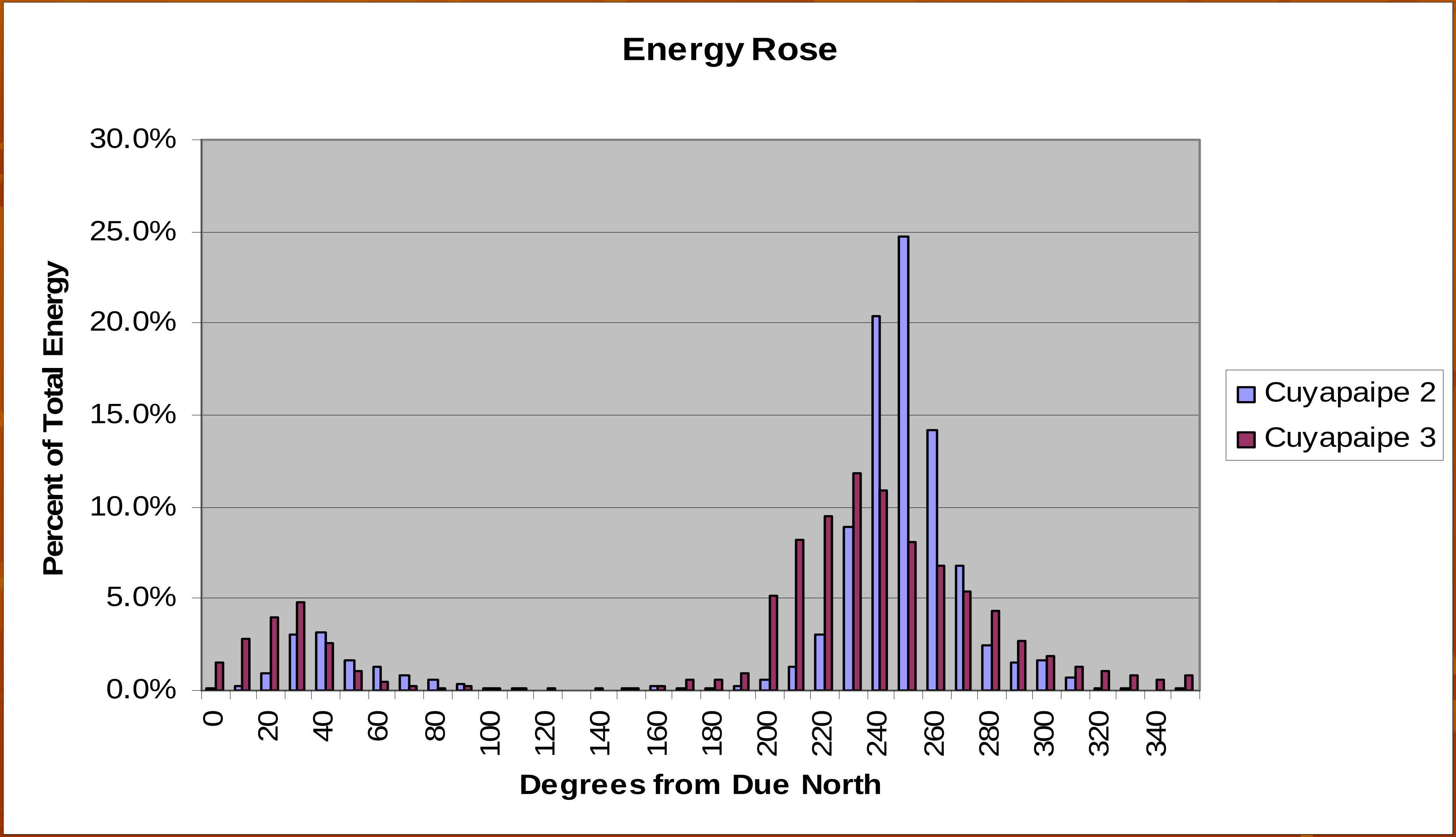
Kumeyaay - Cuyapaipe #1 - 67m
Gamesa Eolica G87 2MW

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%

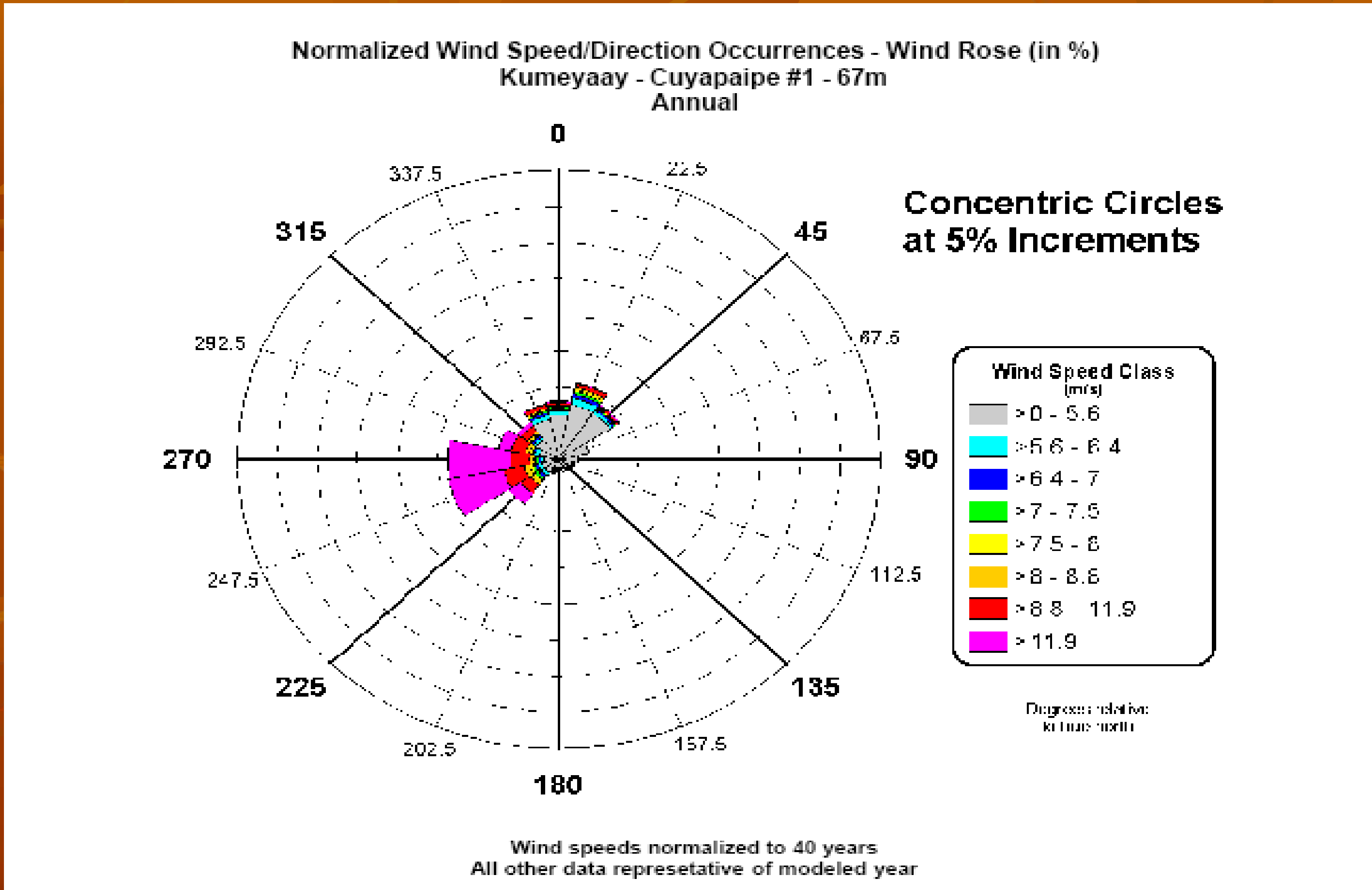
Kumeyaay - Cuyapaipe #2 - 67m
Gamesa Eolica G87 2MW

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%

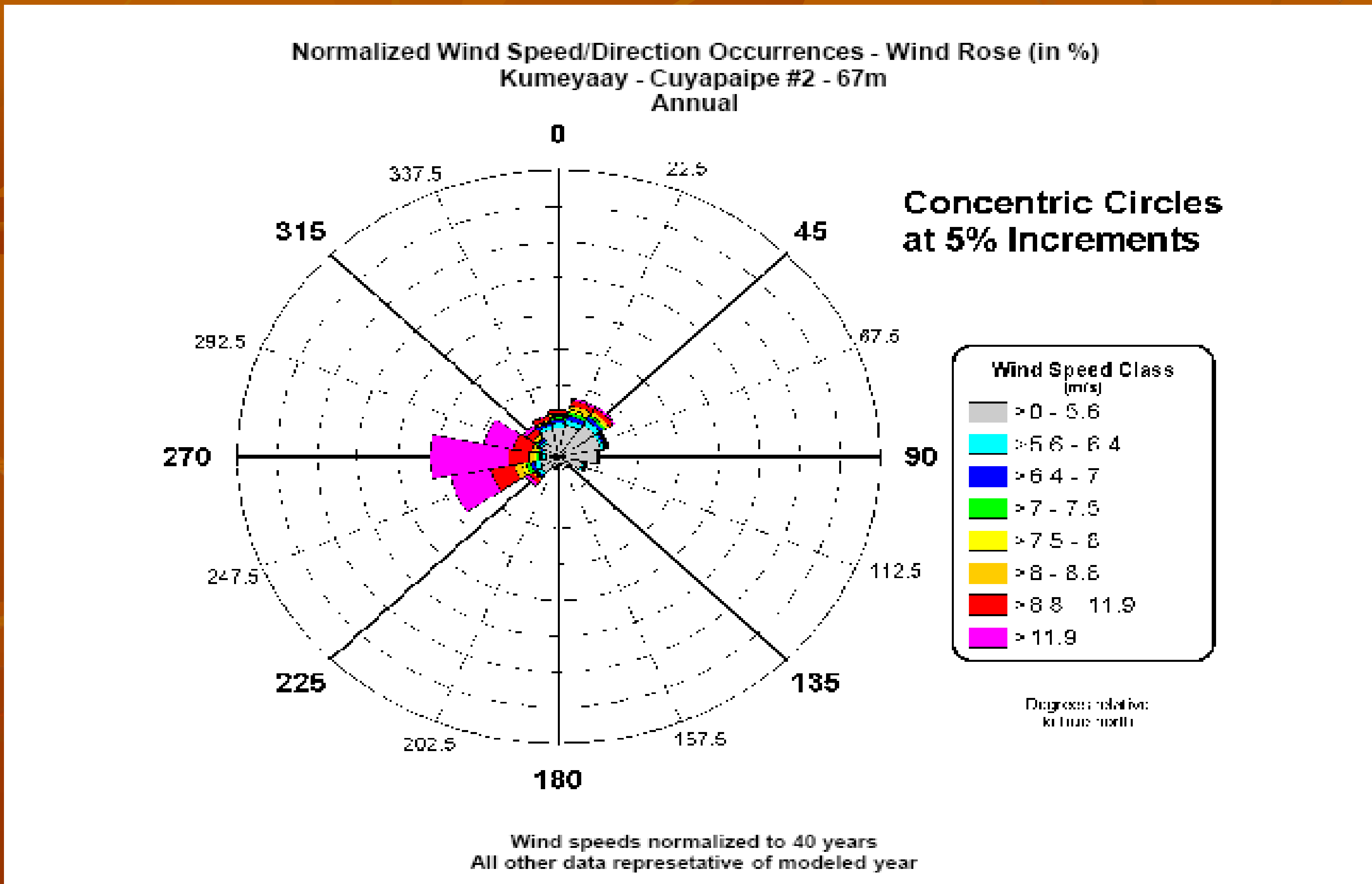
Energy Rose


Energy Rose
30.0%
25.0%
20.0%
15.0%
10.0%
5.0%
0.0%
Percent of Total Energy
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
Degrees from Due North
Cuyapaipe 2
Cuyapaipe 3

Wind Rose #1


Normalized Wind Speed/Direction Occurrences - Wind Rose (in %)
Kumeyaay - Cuyapaipe #1 - 67m
Annual
0
22.5
45
67.5
90
112.5
135
157.5
180
202.5
225
247.5
270
292.5
315
337.5
Concentric Circles
at 5% Increments
Wind Speed Class
(m/s)
>0 - 5.6
>5.6 - 6.4
>6.4 - 7
>7 - 7.5
>7.5 - 8
>8 - 8.8
>8.8 - 11.9
>11.9
Degrees relative
to true north
Wind speeds normalized to 40 years
All other data represetative of modeled year

Wind Rose #2



Normalized Wind Speed/Direction Occurrences - Wind Rose (in %)
Kumeyaay - Cuyapaipe #2 - 67m
Annual
0
22.5
45
67.5
90
112.5
135
157.5
180
202.5
225
247.5
270
292.5
315
337.5
Concentric Circles at 5% Increments
Wind Speed Class
(m/s)
> 0 - 5.6
> 5.6 - 6.4
> 6.4 - 7
> 7 - 7.5
> 7.5 - 8
> 8 - 8.8
> 8.8 11.9
> 11.9
Wind speeds normalized to 40 years
All other data represetative 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.

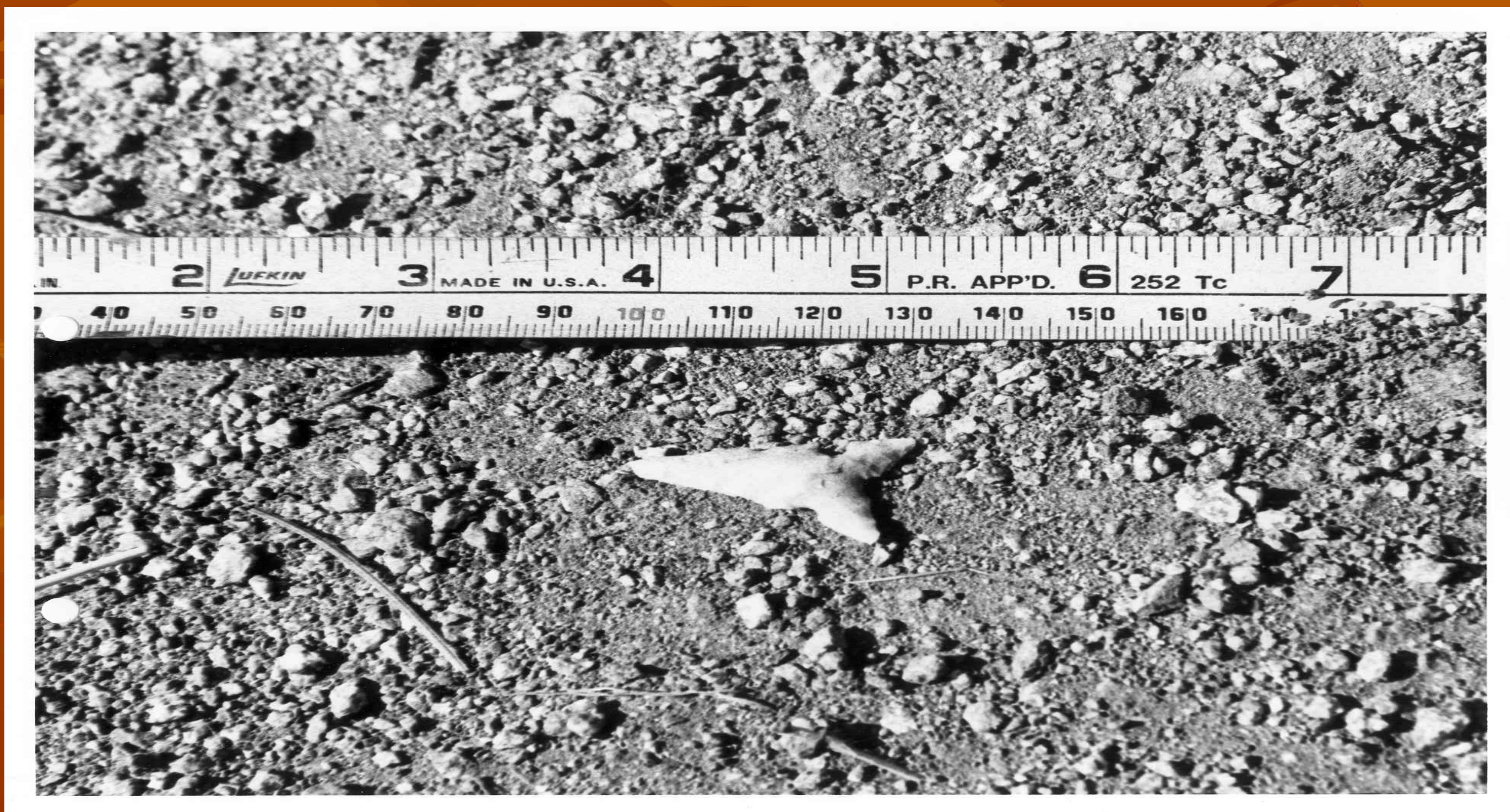
- Task 1. Meteorological Tower Rental and Installation
- The Tribe shall compete and award a contract for rental, installation, maintenance and data monitoring of two (2) meteorological towers to collect data pursuant to Project #1 of the Tribe's Study. The successful vendor shall install the two (2) 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 Ewiiaapaayp 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 Ewiiaapaayp 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

Cuyapaipe 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%	246,122	249,889	253,656	258,679	259,935
Net Present Value of Tribe's Royalty @ 9% Discount	$2,345,964				
Scenario #2 Contract without PTC Inflator					
Power Price ($/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	6,592,556
Tribe's Royalty @ 4%	249,889	253,656	257,424	262,447	263,702
Net Present Value of Tribe's Royalty @ 9% Discount	$2,380,352				

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.

# IWT	Net Output IWT	Net Output MWh/IWT	PPA $/MWh $ 70	$ 71	$ 72	$ 73	$ 74
1	5,022,900.00	5,022.92	$ 351,604	$ 356,627	$ 361,650	$ 366,673	$ 371,696
10	50,229,000.00	50,229.20	$ 3,516,044	$ 3,566,273	$ 3,616,502	$ 3,666,732	$ 3,716,961
20	100,458,000.00	100,458.40	$ 7,032,088	$ 7,132,546	$ 7,233,005	$ 7,333,463	$ 7,433,922
25	125,572,500.00	125,573.00	$ 8,790,110	$ 8,915,683	$ 9,041,256	$ 9,166,829	$ 9,292,402

PPA $/MWh					
$ 70	Ewii Net	1	10	20	25
	4%	$ 14,064	$ 140,642	$ 281,284	$ 351,604
	5%	$ 17,580	$ 175,802	$ 351,604	$ 439,506
	6%	$ 21,096	$ 210,963	$ 421,925	$ 527,407
	7%	$ 24,612	$ 246,123	$ 492,246	$ 615,308
	8%	$ 28,128	$ 281,284	$ 562,567	$ 703,209
	9%	$ 31,644	$ 316,444	$ 632,888	$ 791,110
$ 71	Ewii Net	1	10	20	25
	4%	$ 14,265	$ 142,651	$ 285,302	$ 356,627
	5%	$ 17,831	$ 178,314	$ 356,627	$ 445,784
	6%	$ 21,398	$ 213,976	$ 427,953	$ 534,941
	7%	$ 24,964	$ 249,639	$ 499,278	$ 624,098
	8%	$ 28,530	$ 285,302	$ 570,604	$ 713,255
	9%	$ 32,096	$ 320,965	$ 641,929	$ 802,411
$ 72	Ewii Net	1	10	20	25
	4%	$ 14,466	$ 144,660	$ 289,320	$ 361,650
	5%	$ 18,083	$ 180,825	$ 361,650	$ 452,063
	6%	$ 21,699	$ 216,990	$ 433,980	$ 542,475
	7%	$ 25,316	$ 253,155	$ 506,310	$ 632,888
	8%	$ 28,932	$ 289,320	$ 578,640	$ 723,300
	9%	$ 32,549	$ 325,485	$ 650,970	$ 813,713
$ 73	Ewii Net	1	10	20	25
	4%	$ 14,667	$ 146,669	$ 293,339	$ 366,673
	5%	$ 18,334	$ 183,337	$ 366,673	$ 458,341
	6%	$ 22,000	$ 220,004	$ 440,008	$ 550,010
	7%	$ 25,667	$ 256,671	$ 513,342	$ 641,678
	8%	$ 29,334	$ 293,339	$ 586,677	$ 733,346
	9%	$ 33,001	$ 330,006	$ 660,012	$ 825,015

Political Subdivision

- In 2001, the BIA approved the Village's status as a municipality and the IRS approved its status as a political subdivision of the Tulalip tribal government under the Indian Tribal Government Tax Status Act of 1982, making it the first tribal political subdivision under this Act in the US . Now, the Village - a federal city like Washington , DC- functions like any other municipality. It is governed by a village council that enacts local ordinances and legislation, develops and approves the Village budget, and sets policies. This council appoints a manager who oversees the Village's daily operations. Together the Village and the Tribes provide Village businesses with services and infrastructure including the construction and maintenance of roads; water and sewer systems; fiber optic lines; parks and recreation; planning, permitting, and monitoring services; police and fire services; and emergency services. The Village's four million dollar operating budget is derived from lease income ($1 million), water and sewer fees ($300,000), tribal taxes ($800,000), and tribal funds ($1.9 million).
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- As the first tribal city of its kind, Quil Ceda Village is a path-breaking model of tribal economic development. Several of its strengths deserve particular attention. First, because Quil Ceda Village functions as a municipality, it has been remarkably successful in creating an environment that is attractive to businesses. It offers the infrastructure such as roads, water, and sewage that businesses would expect of any city and a familiar municipal structure for those who might not be accustomed to working with tribal governments. As importantly, the Village displays few of the usual reservation hindrances to economic development such as murky zoning policy, inadequate land-use planning, or sluggish business permit processes. The Village's streamlined permitting, zoning, and planning processes allow businesses that have negotiated their place within the Village to begin operations quickly. The Village council is keenly aware that businesses tend to shy away from cumbersome and politicized bureaucracies and prides itself on being lean and efficient.
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- Second, Quil Ceda Village 's status as a municipality has the potential to benefit the Tulalip Tribes far beyond its current economic enhancements by offering a rare opportunity to tax economic development in Indian Country. Throughout Indian Country, tribes suffer economically because of their inability to collect taxes. In general, tribes' ability to collect property or income taxes is limited by their citizens' long-standing poverty while their ability to collect taxes from businesses is clouded by jurisdictional uncertainty. In many places, tribes seeking to collect taxes from businesses are limited to double-taxation, the levying of taxes in addition to, rather than instead of, local taxes. The Tulalip leadership believes the Tribes' unique political relationship with the Village, their role as the sole developer of the Village, and the Village's status as an IRS-recognized federal municipality all support the public policy principle that tribal taxes should displace outsiders' sales levies. The tribal government designed Quil Ceda Village as a political subdivision of the Tulalip Tribes, a designation officially recognized by the Internal Revenue Service under the Tribal Government Tax Status Act of 1982 because doing so authorizes tribes to collect taxes to reimburse their provision of public infrastructure and services. The Tulalip Tribes are now investigating their ability to collect sales taxes generated in Quil Ceda Village . In particular, the Tribes are seeking to obtain a portion of the taxes that the state of Washington currently collects from businesses in the Village. If the Tribes succeed, they will have blazed a new trail for other Indian nations to follow.

Sunset at the North Pole