PLATO – Plateau Observatory



What is Plato?

Stand alone 1 KW diesel generator module One year service interval (dome A – running for 500 days unattended) Developed by the University of New South Wales.

UNSW has over a decade worth of remote power system experience in Antarctica (Plato – AASTINO)



UNSW has a \$440K US grant to develop a power system suitable for our use. It's intended to run a terahertz receiver to go at dome Fuji.

Estimated: 2000 lbs, yearly fuel requirement of 150 gallons

2000 lbs may seem heavy, but shipping weights are similar

Pros:

A wind/hybrid system will have periods where no power is available for science. The UNSW / Plato system does not have this problem.

Monthly Average Wind Speeds (knots)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
2008	7.3	9.1	10.1	10.7	<u>8.2</u>	<u>7.8</u>	10.9	12.7	10.9	8.7	9.2	11.2

Accounting for altitude, May/June will result in an average power production of less Than 40 watts per Bergey xl1 Current South Pole Wind Turbine Results:

Abundantre ARE1 10-HV ($2.5\ \text{KW}$) on a 41 ft tower

DATE	APPROXIMATE TEMPERATURE F	Watts(Pac)	kWh READING
4/1/2010	-62	2112	914.5
4/2/2010	-72	681	933.2
4/3/2010	-84	251	940.9
4/4/2010	-68	628	957.5
4/5/2010	-74	1759	972.1
4/6/2010	-73	214	999
4/7/2010	-65	59	1005
4/8/2010	-73	48	1012
4/9/2010	-84	488	1019
4/10/2010	-90	37	1027
4/11/2010	-88	119	1032
4/12/2010	-92	138	1034
4/13/2010	-99	36	1036
4/14/2010	-94	85	1037
4/15/2010	-87	89	1038
4/16/2010	-72	12	1039

Servicability / Personnel Costs

Repairing a generator in a box is much easier than climbing or lowering a 60 ft tower In the middle of winter. RPSC keeps a diesel mechanic on station, but no windmill mechanic.

Scaling:

Scaling power production up with the UNSW system can be done by adding a larger Fuel tank. Scaling up a few more watts with a wind/solar hybrid system has the potential To require a new tower/generator.

Shielding:

Shielding a generator completely enclosed in a metal box should be easier than shielding A generator on a tower with long cable runs.

Engineering Risks:

The UNSW group has over a decade experience with remote power system in Antarcitca. The design they are proposing has been tested in harsher environments than the pole.

Cons:

It's expensive. Estimates per 200 watt generator unit put the price tag at \$85K US. BUT.. We would not be responsible for any of the engineering costs associated with Getting a system to work correctly in Antarctica.

The UNSW/PLATO system does require fuel and yearly maintenance.

Wind question to answer:

To ameliorate the severity of the blackouts with a wind / solar hybrid system A power conservation mode should strongly be considered.

Wind speeds can be predicted!

Put selected stations into a sleep mode?

Turn off selected channels?

What works for science??