

## Bergey Wind Power XL.1

Hub height 100'-1" (30.5m)  
Lower anem 60' (18.3m)  
\*changed from 20m on 5/31/05 BJS to reduce vibration  
Upper anem & vane 91.8' (28m)

The Bergey XL.1 was installed by the SWI crew on July 15, 2004.

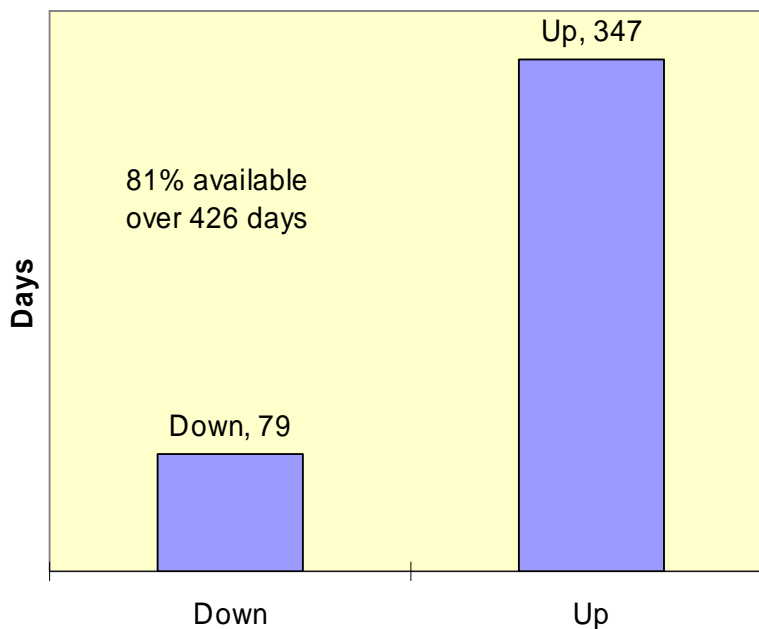
The 105-foot NRG tower and the 1kW, 24VDC battery-charging turbine were installed per the manufacturer's recommendations. A combination of screw-in augers and arrowhead anchors were used. The tower came complete with pipe.



### Availability

From the 7/15/04 installation until the 9/13/05 decommissioning, the XL.1 has been available 81% of the time. Periods of downtime were experienced due to hurricane damage, controller failure, yaw shaft failure, and breaker tripping. Replacement parts and turbines were covered under warranty except for the first set of replacement blades. All repairs were performed onsite by SWI personnel.

**Bergey XL.1 Availability**  
7/15/04 to 9/13/05



**Table 1** Failures and repairs for the Bergey XL.1

<b>Failure</b>		<b>Repair</b>	
9/17/04	Damaged blades and alternator (Hurricane Ivan)	11/1/04	New turbine and blades
12/9/04	Controller damaged (badly burned)	12/16/04	New controller (with DC breaker)
12/25/04	Yaw shaft failure; machine fell from tower	1/13/05	New turbine (with larger yaw shaft) and blades
8/30/05	Breaker tripped	9/8/05	Reset breaker

### ***Activity Log***

Browse the activity log for details and photos.



**7/15/04** Installed



**9/17/04** Hurricane Ivan visits the High Country



**9/22/04** Bergey missing a blade after Ivan



10/4/04 Investigating hurricane damage, broken blade



10/4/04 Hurricane damage, burned alternator

*The XL.1 was left in a shorted out state during the Hurricane. In retrospect, the machine would have had a better chance of survival if left in the freewheeling state.*

**11/1/04**

Machine put back up



**11/1/04** Machine going back up after repairs

**11/18/04**

Connected AirX & Bergey to the battery bank and battery bank to inverter. Charging. Called Xantrex for help setting up. (360-435-8826/1)

SW series rev 4.20  
Model SW4024  
S/N A10006289  
w/ GTI

\*\* set turbine float voltage(s) higher than inverter setting by .5 to 1V \*\*

Bergey reg	28.1V
AirX	28.2V
Xantrex	26V (sell and float)

**11/26/04**

The top guy wire on west side (Pinnacle side) had loosened up significantly. Tightened it up and check the others.

**12/9/04** (25mph)

Last night, the controller burned up. The room was filled with smoke and stink. Steve Wilke recommended leaving it going unloaded but it will be loud. Took some pix to send.



**12/9/04** Burned controller

**12/15/04** (9mph, sunny, cold)

New controller installed. Batt – first, check polarity, batt +, wind -, check polarity, wind +, batt lights on, wind too light to start turbine. This controller is equipped with a 60A DC breaker.

Wind pickup up a little and turbine started in power boost mode (blinking green)

**12/29/04**

Arrived to photo the Bergey which had broken at the yaw shaft over Xmas and fell to the ground. (12/22-24)



**1/12/04** Broken yaw shaft. The landing left a nice dent on the ground.

**1/13/05**

Lowered tower, installed new turbine with larger yawshaft and properly sized adapter (no need for our shims). Help from Raichle's RE class. Raised tower.

During installation, noticed that a brush was bent away from the slip rings. Removed brushed, fixed spring shape, reinstalled.

**1/14/05**

Nose cone blew off last night. 60A breaker was tripped, reset it. Turbine is furled and slow, gusty wind, icy on everything.

**1/24/05**

Breaker tripped, reset it. Set voltage reg from 28 to 29V to try and stop the occasional dump.

**2/11/05**

Cliff called and reported that a guy wire had broken (south top guy). The guys were attached to arrowhead anchor and the guy started to fray possibly because of the small radius. Mike repaired. Need to put thimbles on the arrowhead anchors. The north and east anchor points are screw-in anchors with a much bigger steel end to increase radius of guy.

**2/15/05**

Replaced chip with new one to possibly prevent tripping of breaker (per Bruce at Bergey)

**4/6/05**

Bergey was tripped. Wire run from building to top of tower is about 265 ft. Brent emailed Bergey about tripping. Adjusted wire tension on tower.

**5/31/05**

Joe, Adam, Brent

Lowered XL.1, went down real smooth with new lower guy placement (we moved the two low guys to an arrowhead anchor more inline with pivot line)

Moved lower anemometer to 60', closer to a guy connection to reduce vibration, per NRG. Replaced broken instrument with new anemometer (cup was broken off, NRG suspects vibration)

Replaced wind vane (cracked housing)

One blade was a bit loose. Bolt holes slightly enlarged and oblong. Measure tip-to-tip distance and re-torqued to 40 ft-lbs.

Inner bolt holes on blade root are showing some missing/loose blade material.

Redrilled holes in spinner & re-installed with washers.

Slip ring brush was flipped over. Removed brushed, cleaned, bent springs closer, re-installed.

Noticed some (slight) play in the yaw bearing, otherwise, pretty tight.

Replaced one tail screw. Some cracking on tail holes. Hinge looks ok.

### **6/26/05**

Lowered machine during Bergey workshop with Steve Wilke. New spinner, cleaned brushes, tightened yaw bearing castle nut, and replaced blades.

*The blade replacement corrected the blade noise issue we had been experiencing for months. The machine is very quiet now. If your machine sounds like a flock of geese in low wind, you may need new blades.*

### **8/30/05**

Bergey breaker was tripped and spinner is missing again; reset breaker. Found spinner to the north of the tower at the edge of the woods.

### **9/10/05**

Took down for the workshop, looks fine. Top guy got snagged on a parked truck's bumper on the way back up...no parking!

### **9/13/05 Decommissioning**

Shorted the Bergey and removed the inside equipment in preparation for the new Whisper 200.

**9/15/05** Took the machine down and dismantled the system. Adrian built a crate for it.



**9/15/05** Adrian packaging the XL.1 for transport back to the TVA