

Santiam Valley Ranch Wind Turbine Project, 2010

The goal of the Wind Turbine project is to install a wind turbine system generating 23,553 kW of annual energy output, equating to 92.3% of present electrical needs for farm use.

Working with Kardon Construction, Lyons, OR, we received a \$20,000 USDA Rural Development's Rural Energy for America Program (REAP) Grant, along with assistance provided by Energy Trust of Oregon, Oregon Department of Energy's Business Energy Pass-Through Cash Option (BETC) and U.S. Treasury Renewable Energy Grant. Additionally, we worked with Portland General Electric (PGE) Net Metering Program, wherein installation of a bi-directional meter will allow tracking excess power of the system and crediting to our PGE account. Information from the site will be shared with Energy Trust of Oregon, based on installation of Wind Monitoring Equipment on the tower.

Financing of the project must be paid up-front, with assistance noted above approved for payment following completion. Following an appraisal of the farm, a second mortgage was made with NW Preferred Federal Credit Union, Stayton, to finance the project.

We applied for a Variance with Marion County, which notified neighbors of the proposed 20 kW small wind system supported by a 120' lattice tower. Additional Variance requirements from the County required paving 20' of our driveway where it adjoins Hunsaker Road.

Additional Building and Electrical Permits were required from Marion County. Reinforced concrete inspection and high strength bolt inspection were reviewed by Carlson Testing and Darrell Huber, Structural Engineer.

The project began in early July. Jim Bethel dug the excavation for the foundation of the tower, 22' x 22' x 5', which was placed on the field south of the old barn. Of concern was placing the wind turbine on a site which is not used primarily by ducks and geese migrating in the Santiam Valley Flyway. This site was chosen because it was closet to farm structures and was easily located to hook-up with the PGE utility lines close by.

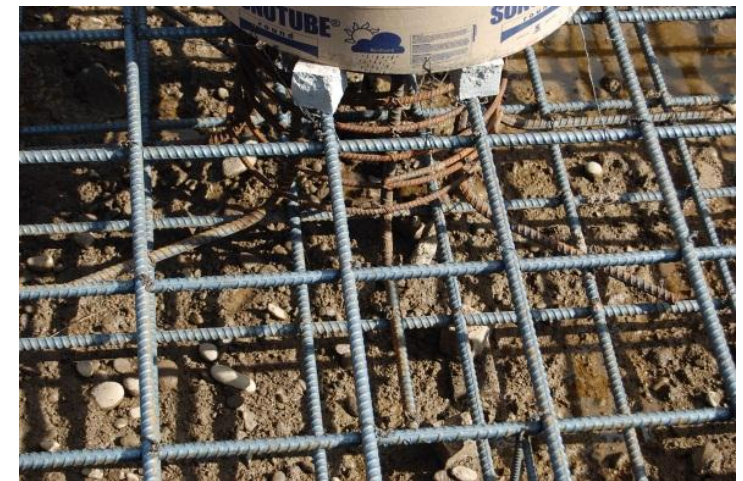




Note: the field behind has been planted to green beans.

After the excavation, the project called for building of rebar cage and mounting of anchor bolts for the tower to be inspected by Marion County.





Note: Beans are growing behind the wind turbine site.

Eight thousand pounds of rebar and 50 yards of concrete weighing 200,000 pounds were installed to anchor the wind turbine. In addition, the dirt removed from the hole was later piled on top of the rebar/cement foundation. The tower and turbine weigh 9,350 pounds.

After inspection by Marion County, Carlson Testing, and a private structural engineer, it was time to pour cement.



Five cement trucks came on July 13th. There were two inspectors on site. Carlson Testing, took samples of the cement, which will be evaluated for structural strength over the next four weeks. They also sampled the amount of oxygen and density of the cement.



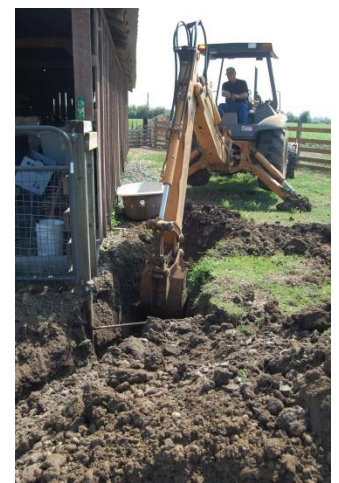


The Structural Engineer, Darrell Huber, reviewed the work in progress. 'Twas a day of back-breaking work. The cement was vibrated to decrease the amount of air and to ensure good adherence with the rebar.

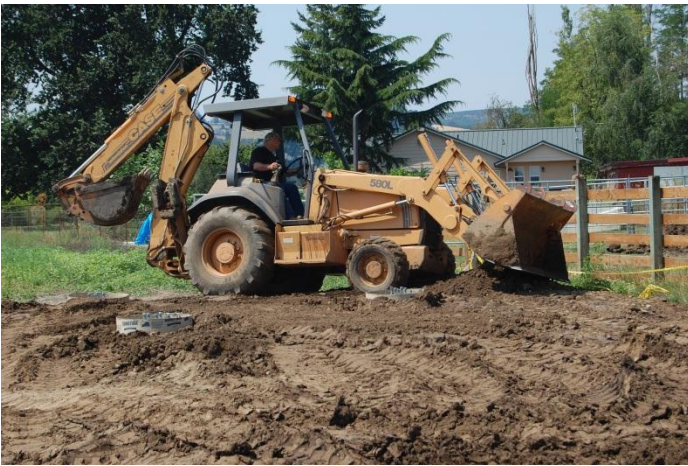
Note: The beans are growing!



Backhoe work began on August 5th to dig underground electrical lines. Underground lines at 3' deep were dug from the PGE utility pole to the new meter base at the old barn.



Dirt was piled on top of the foundation.



Note: the beans are growing; note the irrigation too.

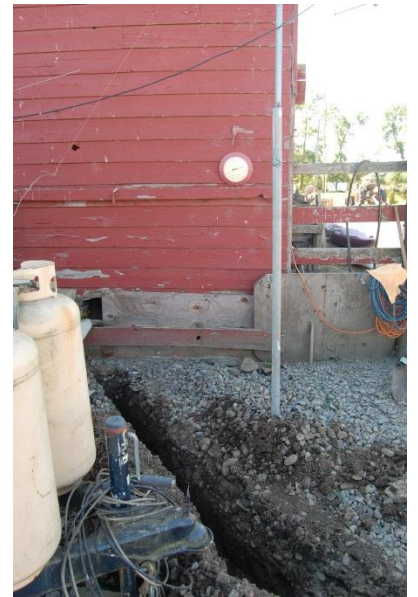
Conduit, connecting the PGE utility pole to the new meter at the old barn, was installed and covered.



On August 16, a ditch witch was used to put in underground lines, connecting the shop and horse barn to the new meter. To meet current State electrical regulations, new outdoor electrical shut off boxes had to be added to the shop and the horse barn.



Underground line to the shop from the new meter base (at the old barn).



Underground line to the horse barn from the new meter base.



Underground line to turbine.



The Jacobs 31-20 kW Small Wind Generator arrived at the farm on August 30th. Kardon Construction assembled the generator, inverter and tower assembly. *Note: the beans growing and harvested.*





The wind turbine was raised on September 10th. Two cranes came to the farm, one to raise the turbine and the other to place it upon the three foundation structure.

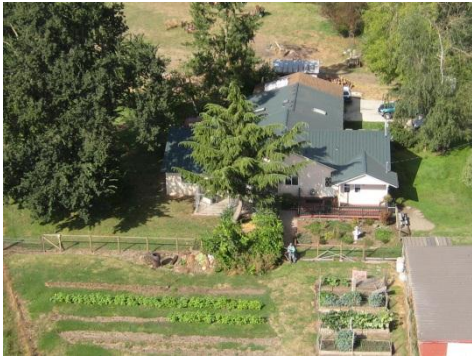
What a great day!





After the wind turbine was raised, additional work was completed on the 120' tower, installing wind monitoring equipment and securing electrical conduit.

It was great to see the farm from on top of the wind turbine.



View of house and outdoor garden
(photo from Kardon Construction)



West view of the some of the corn crop and the ponds *(photo from Kardon Construction)*

The farm looking east
from Summit Loop.





Electrical work continued and continued and continued. The meter was installed, and PGE placed wire into the conduit that led from the utility pole to the old barn. Following countless inspections from Marion County, the wind turbine was finally creating energy at Santiam Valley Ranch.

The electrician spent a lot of time, and finally Ken completed the shut-off meters that went into the shop and horse barn.

With Ken's help, the electrical work was finally completed by the end of November, 2010.

Kardon Construction re-graveled the driveway to the barn.



Meter base connecting to power utility pole in background.



Inverter, meter base and hook up to turbine.



Electrical turn off at turbine.



Electrical disconnect --

← horse barn

→ and shop



Karen from Kardon Construction presenting the Wind Turbine Operating Manual .



Welcoming Change

Producing energy created effortlessly from our wondrous planet