

# Wind, An Important Source For Electrical Power

By Christopher D. Turner  
 Appalachian State University lies at the base of Howard's Knob in Boone, North Carolina. On top of Howard's Knob a 2-million watt turbine built for the Department of Energy and NASA acknowledges the wind as an energy resource in the Blue Ridge Mountains.

Dr. J.L. Mackey wanted to prove that small scale wind machines could also harvest the wind as a source of electrical power. He wrote a proposal to the Department of Energy's Small Grants Program to demonstrate two small scale wind systems. One would be a 1500 watt generator designed to interface with the utility, and the other would be an 1800 watt wind generator designed to store energy in batteries. In his proposal, Mackey stated that he would hold several workshops open to students and members of the community. The workshops would be taught at the Episcopal Mission Farm in Valle Crucis on land the Mission was allowing the Earth Studies Program to develop as an appropriate technology showcase.

Although the Department of Energy did not provide the funding Mackey had

requested to do monitoring and maintenance, it did grant the University enough money for him to purchase two wind generators. The Department of Energy also specified that it wanted both wind machines to interface with the utility.

With these restrictions in mind, Mackey purchased two 1500 watt Enertech wind generators in the Spring of 1980. To help him teach the wind workshops, Mackey hired Charlie Hall from West Topsham, Vermont. Since 1971 Hall had been going out West to collect old wind generators and towers, and then bringing them back to Vermont for rebuilding and resale. Mackey and Hall had met at Goddard College when Hall was teaching a wind workshop there.

The workshops began after the Spring semester of 1980. Mackey taught the theoretical portions and Hall the "hands on" techniques. The first workshop was held on a weekend which suited people who were not students better than the longer three week session which followed it. Both workshops stressed the fundamentals: Assessing your energy needs; measuring the wind as an energy resource; how power in the wind is converted to electrical energy; how

magawatt machine on Howard's Knob. Unlike the big, two bladed wind generator, Enertech used three blades with a total diameter of 13 feet. The big wind machine has a blade diameter of 200 feet. Since the power you can get from the wind is directly related to the square of the blade diameter and the cube of the wind speed, you can see why the big wind generator is so much more powerful.

Both the Big wind generator and the Enertech interface with the utility lines. Unlike the large generator which needs transformers and complex synchronizing gear, the Enertech simply plugs into a 20 amp wall outlet. The Enertech uses an induction motor - generator which receives its excitation from the utility line. For this reason, it will not operate when the utility power goes off. A wind measuring device called an anemometer is wired to the control panel. When the wind measures 10 miles per hour the anemometer signals the motor to start the machine up. Once the generator spins over 1800 revolutions per minute it begins to generate power. The generator reaches its rated power at a wind speed of 21 miles per hour. Winds over 40 will cause the machine to automatically shut down to avoid severe stresses.

The Enertech System uses the utility as a storage system. When the wind machine produces more power than is being used by the owner, the excess feeds into the utility line. If the wind machine does not produce all the needed power the power company supplies it. The usual procedure for metering involves two meters; one for measuring power used and one for power produced. The utility pays you for your power at wholesale rate while you pay for their power at retail rate which is higher.

Next to repelling out of a helicopter, working on top of a tower using a safety belt is about the most exciting thing I've ever done. The thrill we experienced in installing the wind system and actually seeing it convert wind into electricity is something we shall always cherish.

The Enertech 1500 is a horizontal-axis, down wind machine just like the two

magawatt machine on Howard's Knob. Unlike the big, two bladed wind generator, Enertech used three blades with a total diameter of 13 feet. The big wind machine has a blade diameter of 200 feet. Since the power you can get from the wind is directly related to the square of the blade diameter and the cube of the wind speed, you can see why the big wind generator is so much more powerful.

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# The Carolina Review

THE LAST... Hopefully this week will see the last of the redistricting squabble between North Carolina legislators and the U.S. Justice Department in Washington.

With that, the legislators and the people they represent probably will rejoice. But there may be trifle little for anyone to be rejoicing.

One last final look at the redistricting argument might be enlightening. And probably no one hopes it will be the last look more than those who have been writing about redistricting.

As things now stand, and of course they may crumble, the North Carolina primary date will be June 29. There will be only one primary (except for runoffs where applicable). The change from last week's June 10 date is a result of the Justice Department agreeing to final redistricting lines, but only if North Carolina would allow extension of filing dates and a little extra time for campaigning.

The extension of filing dates and extra time for campaigning are excellent objectives. The short time of the June 10 date was selfishly motivated by legislative incumbents who didn't want opposition. But the rub comes because of

where the directive came from - Justice had said they would approve N.C. redistricting with certain changes in a couple of districts - they had not even ventured into the area of primary dates (at least not publicly).

The directive for extension, one might suspect, would have been more appreciated had it come from fair-minded legislators. It didn't.

In effect, the U.S. Justice Department again reneged on its word by threatening to veto the plans unless they got something else in addition to further district line changes (extension).

Unfortunately, the legislators wanted the June primary date so badly, that they couldn't tell the Justice Department to go jump and to take the matter to court - some of them were just too fed up with the whole mess.

The words of Rep. Bill Watkins, D-Oxford, may have been those of a prophet

(as has happened for the homespun legislator in the past). Watkins had warned the General Assembly early-on to quit trying to satisfy the bureaucrats and take it to court. Watkins had cited UNC's success against Washington intrusion as inspiration.

Some say it's too bad the legislators weren't inspired.

PERRY... At least North Carolinian Gaylord Perry is inspiring and inspired. The winningest active baseball pitcher won number 299 last week and might get number 300 this week. Only 14 major league pitchers have won 300 games in a career before. He is almost a certainty for the Baseball Hall of Fame, upon retirement. But why should he retire? The Seattle Mariners' manager says the 43-year old fast-ball pitcher was the best on his staff during spring training, and Perry looks awful good right now.

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Sincerely,

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