

Wind farm wouldn't serve many homes

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The subheadline on John Cramer's Jan. 23 news story on the proposed Highland County wind farm includes a false claim: "Supporters say the \$60 million project would generate enough electrical power for more than 15,000 homes." In fact, the statement is both misleading and false.

The concept of "homes served" is used in the electric industry as a way to give some idea of the benefits associated with building a generating plant – the amount of electricity that would be produced without using terms like megawatt-hours or kilowatt-hours that don't mean much to most people.

The concept is always misleading because residential users of electricity ("homes served") account for only a part of total electricity demand. In 2005, Virginia residential customers accounted for only 41 percent of the electricity used, while the rest was used by commercial, industrial and transportation customers.

"Homes served" should never be used in connection with wind or solar energy.

The concept "homes served" probably can be defended, but only if the generating unit being described is a reliable or "dispatchable" unit (one that will produce electricity whenever needed) and the calculations of "homes served" are done honestly.

Use of "homes served" is not defensible when referring to generating units that are available only intermittently, such as those powered by wind and solar energy, because the electricity can't be counted on when it is needed by customers.

No "homes" are really served by intermittent wind or solar energy unless the people in those homes have expensive battery storage systems or they are willing to have electricity only when the wind blows or the sun shines.

The "15,000 homes" claim for the Highland County wind farm is false, as simple arithmetic shows:

1. The output of the generating unit, or wind farm, must be estimated in kilowatt-hours (kWh). This is done by multiplying the "nameplate" capacity of the generating unit (or wind turbines) by the hours in some period of time (usually a year) and then multiplying that result by the unit's projected "capacity factor" (a measure of electricity actually produced). The result is some number of kilowatt-hours. For example, the expected annual output for a 500,000 kW base load coal-fired generating unit with a probable capacity factor of 80 percent would be 3.5 billion kWh. (500,000 kW x 8,760 hours x 80% = 3.5 billion kWh.)

2. Apparently the developers of the 39 megawatt (39,000 kW) wind farm proposed for Highland County have not disclosed its expected capacity factor. However, according to Energy Information Administration data, the nationwide average capacity factor for wind turbines is about 28 percent. Assuming generously that the proposed Highland County wind farm would have a 30 percent capacity factor, its annual output would be 102.5 million kWh (39,000 kW x 8,760 hours x 30% = 102.5 million kWh).

3. Next, according to EIA, in 2005, 3 million residential customers in Virginia used 44.7 billion kWh of electricity for an average of 14,702 kWh per customer.

4. Now, dividing the projected Highland County project's electricity output by the average kWh used by a "home" in Virginia, the result is 6,972 "homes," not 15,000.

The discussion and illustration above underscores two important facts about wind energy and the proposed Highland County wind farm:

1. The huge wind turbines (more than 35 stories tall) would produce very little electricity. The estimated 102.5 million kWh per year that might be produced equals less than one-tenth of 1 percent of the 108.6 billion kWh of electricity used in Virginia during 2005.

2. Because wind turbines cannot be counted on to produce electricity when demand is highest, other generating units – reliable units that can be counted on whenever needed – will have to be built to satisfy Virginia's growing demand for electricity. If the Highland County wind farm is built, electric customers will, in effect, be paying twice; once for the low-value electricity from the wind farm and again for reliable generating capacity.