

False Claims about “homes served” by electricity from wind

Anyone using the phrase “homes served” to describe the potential output from one or more wind turbines is demonstrating that he or she (a) doesn’t understand the facts about wind turbines, (b) believes false claims from the wind industry, or (c) is trying to mislead their reader or listener.

False statements about “homes served” by wind turbines are not the only – and certainly not the most important -- false claims regularly made by wind industry developers and lobbyists. But they are annoying when politicians, naïve reporters, and others adopt and regurgitate them.

The concept of “homes served”

The concept of "homes served" has long been used in the electric industry as a way to give some idea of the amount of electricity that would be produced by a proposed generating plant without using such terms as megawatt or kilowatt-hours that mean little to most people. The concept is always misleading since residential users of electricity (i.e., “homes served”) account for only 37% of all US electricity use.ⁱ

Claims about “homes served” by a proposed “wind farm” or other generating unit are usually based on a three step calculation. Specifically:

- Start with an assumption (i.e., a guess) about the amount of electricity that would be *produced* annually by a “wind farm” or other generating unit, in kilowatt-hours (kWh) or megawatt-hours (MWh).ⁱⁱ
- Use an estimate of the amount of electricity used annually (in kWh) by an average residential customer in the area or state where their “wind farm” is located.ⁱⁱⁱ
- Divide the assumed annual production of electricity by the estimated annual average residential electricity use.

Concept can be useful when talking about reliable generating units

While misleading, the concept, “homes served” has some validity when used to describe the *output from a reliable, “dispatchable” electric generating unit*; i.e., one that can be called upon to produce electricity whenever it is needed. Such generating units are the ones that are counted on by the electric industry to provide a reliable supply of electricity for customers every day, at all hours of the day, year around.

“Homes served” is NOT a valid concept when referring to wind turbines and “wind farms”

Using “homes served” when talking about wind turbines and “wind farms” is *both false and misleading* for several reasons; specifically:

1. No homes are really served by wind. In fact, NO homes are served by wind energy because wind turbines produce electricity only when wind speeds are in the right speed range (see

below). Homes using electricity from wind must always have some reliable energy source immediately available to provide electricity when there is insufficient wind unless the residents are content to have electricity only when the wind is blowing in the right speed range – a condition that few in America are willing to tolerate.

2. Electricity from wind turbines is inherently intermittent, volatile, and unreliable. Wind turbines produce electricity only when the wind is blowing within the right speed range. Wind turbines typically start producing electricity at around 6 mph, reach rated capacity about 32 mph, and cut out about 56 mph. Unless a home owner has an expensive battery storage system, such volatile and unreliable output wouldn't be suitable for lights, heating, computers, appliances, or many other purposes .
3. Electricity from “wind farms” is seldom available when most needed by home users. Again, the output of wind turbines is dependent on wind conditions. Depending on the specific area, winds tend to be strongest at night in cold months. However, electricity demand in most areas of the US is heavily concentrated during daytime and early evening hours. Even worse, wind turbines cannot be counted on to produce at the time of peak electricity demand which often occurs on hot weekday late afternoons in July and August. At the time of peak electricity demand, wind turbine output may be in the range of 0% to 5% of rated capacity.
4. The electricity produced by wind turbines is low in value compared to electricity from reliable generating units. That's because it is inherently intermittent, volatile, unreliable, and not available when most needed -- as described in paragraphs 2 and 3, above.
5. Not all the electricity produced by a wind turbine actually reaches customers or serves a useful purpose. Some electricity is lost as it is moved over transmission and distribution lines that carry the electricity from generating units to homes, offices, stores, factories and other users. The amount of electricity that is lost depends on distance and condition of lines and transformers.

“Line losses” are a significant issue for wind energy because huge, obtrusive wind turbines (often 40+ stories tall) and “wind farms” are not welcome near metropolitan areas that account for most electricity demand. Instead, they often are located distant from the areas where electricity is needed and require expensive transmission line capacity which they use inefficiently. (Ironically, the lucrative federal tax credits provided to “wind farm” owners are based on electricity *produced*, not the lesser amount that actually reaches customers and serves a useful purpose.)

6. Claims of “homes served” by wind energy are additionally misleading because of the high true cost of electricity from wind turbines. Claims that the cost of electricity from wind turbines is “competitive” with the cost of electricity from traditional sources are false. Such claims typically do not include the cost of (a) the huge federal and state tax breaks available to “wind farm” owners,^{iv} or (b) the cost of providing the generating capacity and generation that must always be immediately available to “back up” intermittent, unreliable wind turbine output and keep electric grids reliable and in balance.

Claims of “homes served” should always be challenged

Any use of the “homes served” assertion in connection with a “wind farm” should be challenged, whether the assertion is from a wind industry lobbyist, other wind energy advocate, political leader, other government official, or reporter. They should be required to explain each of their assumptions and calculations, and admit that industrial scale wind turbines are useless unless reliable generating units are immediately available to supply electricity when wind is not strong enough to produce significant electricity. Almost certainly, their assertions will be false.

What valid claim could wind industry officials make?

As explained above, wind industry developers, promoters, and lobbyists – and politicians and reporters -- should never use the false and misleading “homes served” metric. In theory, they could justify an assertion that the estimated amount of electricity produced by a “wind farm” – *once discounted for line losses which are likely to be in the range of 5% to 10%* -- may be roughly equal to the amount of electricity used annually by X homes – after doing a calculation such as that outlined earlier. However, as indicated above, even this assertion would be misleading because it ignores the fact that the output from wind turbines is intermittent, volatile, unreliable and unlikely to be available when electricity is most needed.

Other false and misleading claims about wind energy

As shown above, “homes served” are not the only or the most important false claim made about wind energy. Other false claims about wind energy include the following:

- It is low or competitive in cost when, in fact, its cost is high when all true costs are counted.
- It is environmentally benign when, in fact, it has significant adverse environmental, ecological, scenic, and property value impacts.
- It avoids significant emissions that would otherwise be produced when, in fact, it avoids few.
- It provides big job and economic benefits when, in fact, there are few such benefits.
- Reduces US dependence on imported oil when, in fact, it does not.
- Reduces the need for building reliable generating units in areas experiencing growth in peak electricity demand or needing to replace old generating units, when the opposite is true.

Such claims as these have been made often during the past decade or more by the wind industry and other wind advocates. Only during the past 3-4 years have these claims begun to be demonstrated as false and misleading. The facts about wind energy are beginning to show up in the media but, unfortunately, have yet to be understood by most political leaders and regulators.

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Endnotes

ⁱ According to EIA data, the percentage of total electricity use accounted for by residential customers in 2007 varied from lows of 16.3% in DC and 16.7% in WY to 44.6% in AZ and 51.0% in FL – with a nation-wide average of 37%. http://www.eia.doe.gov/cneaf/electricity/esr/esr_sum.html

ⁱⁱ Assumptions about output from proposed “wind farms” start with the rated capacity of the wind turbine(s) in kW, multiplied by the number of hours in a year (usually 8760) and multiplied by the wind turbine(s)’ assumed “capacity factor.” In fact, actual capacity factors can be known only on an after the fact basis. “Capacity factor” is calculated by dividing actual annual production in kWh by the product of 8760 (hrs per year) times the rated capacity of the turbine(s) in kW.

ⁱⁱⁱ Annual residential use of electricity varies widely. According to US EIA, average annual residential electricity use nationwide during 2007 averaged 11,232 kWh -- varying from lows of 6,360 kWh in Maine and 6,960 in California to highs of 15,660 kWh in Alabama and 16,128 kWh in Tennessee. http://www.eia.doe.gov/cneaf/electricity/esr/esr_sum.html

^{iv} Wind industry officials have indicated that just two federal tax breaks account for about 2/3rds of the economic value of a “wind farm.”