

## *Energy Consumption of Wind Facilities*

Large wind turbines require a large amount of energy to operate. Other electricity plants generally use their own electricity, and the difference between the amount they generate and the amount delivered to the grid is readily determined. Wind plants, however, use electricity from the grid, which does not appear to be accounted for in their output figures. At the facility in Searsburg, Vermont, it is not metered and is completely unknown [[click here](#)]. The manufacturers of large turbines -- for example, Vestas, GE, and NEG Micon -- do not include electricity consumption in the specifications they provide.

Among the wind turbine functions that use electricity are the following:\*

- yaw mechanism (to keep the blade assembly perpendicular to the wind; also to untwist the electrical cables in the tower when necessary) -- the nacelle (turbine housing) and blades together weigh 92 tons on a GE 1.5-MW turbine
- blade-pitch control (to keep the rotors spinning at a regular rate)
- lights, controllers, communication, sensors, metering, data collection, etc.
- heating the blades -- this may require 10%-20% of the turbine's nominal (rated) power
- heating and dehumidifying the nacelle -- according to Danish manufacturer Vestas, "power consumption for heating and dehumidification of the nacelle must be expected during periods with increased humidity, low temperatures and low wind speeds"
- oil heater and pump and cooler in gearbox
- hydraulic brake (to lock the blades in very high wind)
- thyristors (to graduate the connection and disconnection between generator and grid) -- 1%-2% of the energy passing through is lost
- magnetizing the stator - the induction generators used in most large grid-connected turbines require a "large" amount of continuous electricity to actively power the magnetic coils around the asynchronous "cage rotor" that encloses the generator shaft. The stator may use power equal to 10% of the turbine's rated capacity, in slower winds possibly more

- using the generator as a motor (to help the blades start to turn when the wind speed is low or, as many suspect, to maintain the illusion that the facility is producing electricity when it is not,† particularly during important site tours) -- at times the grid-magnetized stator must work to help keep the 40-ton blade assembly spinning, along with the gears that increase the blade rpm some 50 times for the generator, not just at cut-in (or for show in even less wind) but at least some of the way up towards the full rated wind speed

There are instances when a turbine consumes more than 50% of its rated capacity in its own operation. The industry doesn't publicize any data; incoming power is not normally recorded.

Engineers share an assumption that wind turbines don't use a significant amount of power compared to their output and thus it is not worth noting, much less metering. Such an assumption could be based on the experience decades ago with small DC-generating turbines, simply carried over to AC generators that continue to metastasize. However errant such an assumption might now be, it stands as long as no one questions it.

The actual amount of consumption could seriously diminish any significant amount of energy.

The electricity used by WTG's is not metered or accounted for in any way, and consequently is not paid for by the WTG operators.

Information was obtained from these sources:

Swedish report on hydrogen and wind power, as printed in [Yes2wind](#).

The Danish Wind Industry Association's [guide to the technology](#).

Industry spec sheets.

*†An observer in Toronto, Ontario, points out that the blades of the turbines installed at the Pickering nuclear plant and Exhibition Place turn 90% of the time, even when there is no wind and when the blades are not properly pitched -- in a region acknowledged to have low wind resources.*