Overstated benefits and understated costs

Industrial Wind Power in the Mountains of Virginia

Wishful thinking

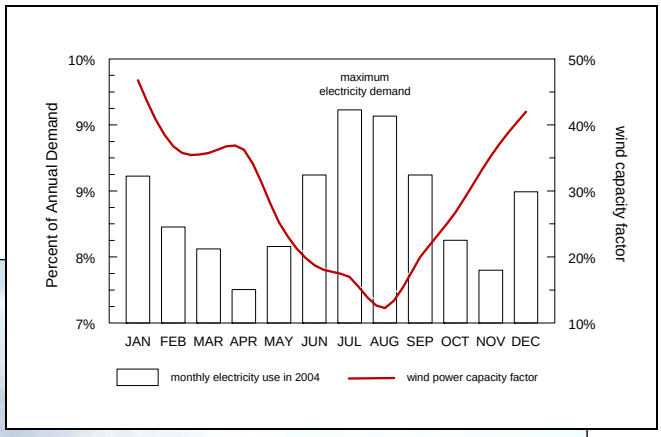
Wind energy is promoted as an alternative to dependence on foreign oil, an alternative to mountain top removal coal mining, an alternative to fossil fuel combustion, and part of the solution to global warming. And it's free!

Reality check

Wind energy is expensive and dependent on subsidies and incentives, it provides relatively little in terms of energy and air quality benefits, it has significant wildlife impacts, and its development threatens our remaining wild landscape. Yet public perception has been carefully managed – benefit claims are wildly exaggerated – and we are distracted from real solutions to our energy problems. Before we allow this new industry to transform our mountain landscape we need to take an objective look at the costs and benefits.

The 44-turbine Mountaineer wind project in West Virginia was the first large-scale wind project in the central Appalachian region. During the first year of operation an estimated 4,000 bats were killed by turbine blades. The construction of this project resulted in the clearing of more than 4 acres per turbine and severely fragmented remaining "forest interior" habitat. The company now denies access to independent wildlife scientists. Wind projects on Appalachian ridges pose a high risk to bats, songbirds and raptors – including endangered species.

The large footprint of a low-capacity energy resource



Wind energy projects in the Appalachian Mountains are typically built in strings of about seven turbines per mile along ridgelines. Because wind energy is diffuse and intermittent, very large numbers of turbines and many miles of ridgeline are required to provide even small amounts of electricity.

Approximately 3,000 two-megawatt wind turbines would be needed to satisfy 10% of Virginia's projected annual electricity demand in 2020. This would require about 425 miles of ridgeline development – a distance greater than the length of the Blue Ridge Mountain chain in Virginia.

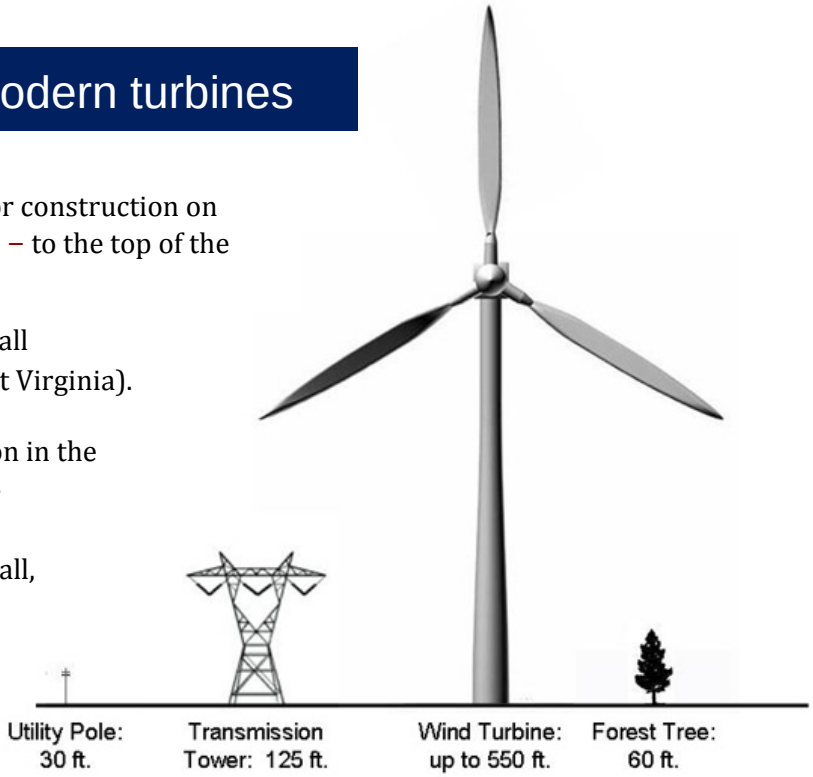
Due to the inverse temporal relationship between electricity demand and wind turbine performance in the central Appalachian states, wind energy is least available when the need for electricity is the greatest. Annual electricity generation by wind turbines installed in the region is less than 30% of rated turbine capacity. This drops to less than 15% in the peak-demand summer months.

The industrial scale of modern turbines

The largest turbines currently proposed for construction on Appalachian Ridges are about 550-feet tall – to the top of the rotor.

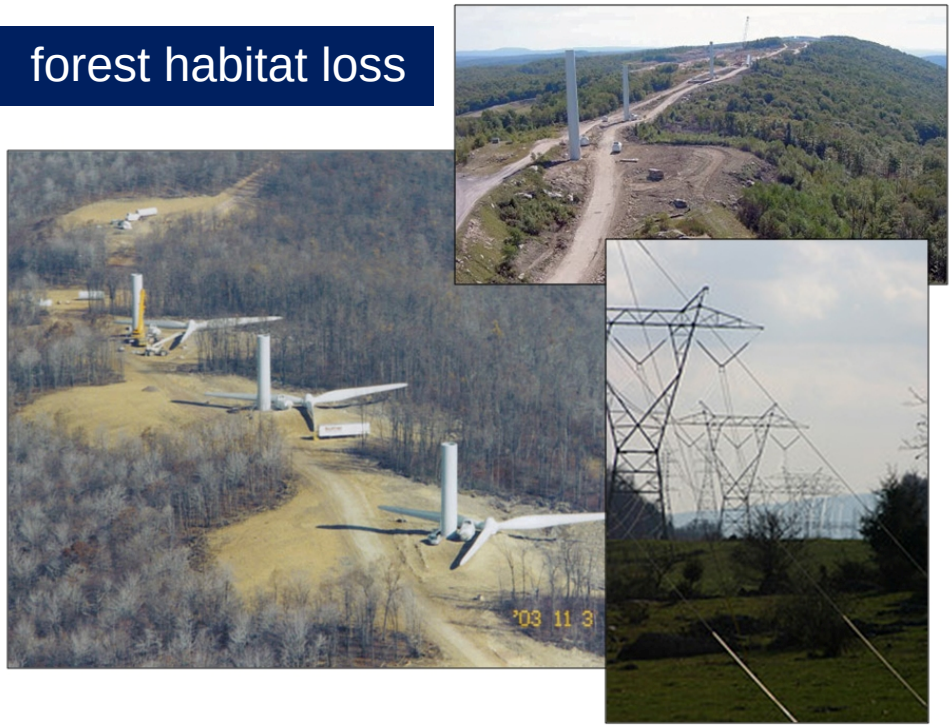
The turbines pictured above are 345-feet tall (Mountaineer Project, Tucker County, West Virginia).

The 131 turbines proposed for construction in the George Washington National Forest on the western side of the Shenandoah Valley (FreedomWorks, LLC) would be 440-feet tall, occupying 18 miles of ridgeline.



Ecosystem harm: forest habitat loss

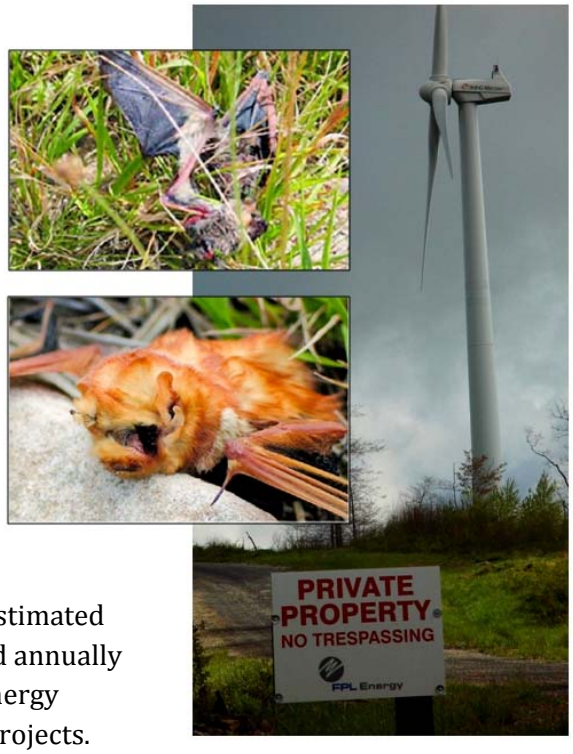
Unlike most areas where commercial-scale wind energy development occurs, wind projects on Appalachian ridges almost always require extensive forest clearing for turbine sites, access roads, and transmission corridors. 3-5 acres are typically cleared per turbine site to provide room for construction and to reduce wind turbulence during operation. Loss of interior forest habitat is even greater, 15-20 acres per turbine. Interior forest, defined as forest habitat that is more than 100 meters from a clearing, is essential for maintaining viable populations of many birds and other wildlife.



Clearing of wide corridors (50-100 feet or more) for miles along the crests of forested mountain ridges to construct and operate wind energy facilities has raised concerns about wind energy development's impacts due to forest fragmentation and loss of forest interior. A number of neotropical bird species with relatively small or declining populations depend on unfragmented Appalachian forests. This may become the primary ecological consideration in future wind power development in this region.

Direct impact on birds and bats

Wind projects on forested Appalachian ridges have the highest bird and bat fatalities documented worldwide. The U.S. Fish and Wildlife Service has advised wind project developers to avoid bird and bat concentration areas, and has repeatedly recommended that developers in the Appalachian region prepare Habitat Conservation Plans and obtain Incidental Take Permits as provided by the Endangered Species Act. No developers have complied. The bat problem is extreme; high bat mortality has been found at all Appalachian wind projects where the problem has been studied.



A recent study conducted by the National Research Council estimated that as many as 111,000 bats and 45,000 birds could be killed annually at central Appalachian wind projects given projected wind energy development and observed mortality rates at existing wind projects. Projections for development have subsequently increased by 150%.

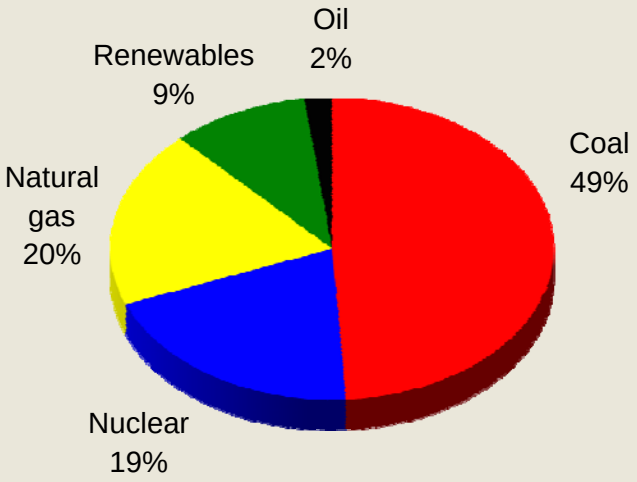
Photos of bats killed by turbines courtesy of Bat Conservation International.

Wind power and energy independence

Wind energy proponents insist that wind energy development is essential if the nation is to achieve energy independence. For example, FreedomWorks, LLC, the company that proposes to construct 131 turbines in Virginia's George Washington National Forest, lists the following objective in its Mission Statement: "*Create and maintain sustainable renewable energy farms for the benefit of U.S. energy independence from foreign oil . . . .*"

In reality, very little oil is used for generating electricity, and much of that is refinery residue.

U.S. electricity generation in 2006



Note: the renewables category is primarily hydroelectric; wind generation provides about 1% of U.S. electricity

Source: U.S. Dept. of Energy, State Electricity Profiles

Wind power and coal consumption

Wind energy proponents insist that wind energy development will reduce coal consumption and thereby reduce mountaintop removal and other forms of coal mining – while reducing the carbon dioxide emissions that cause global warming. Unfortunately, this is not realistic. The recent National Research Council study on Environmental Impacts of Wind Energy Projects found that even with the most ambitious projections for onshore wind energy development in the U.S. (an estimate involving construction of 36,000 wind turbines by 2020) only 4.5% of U.S. electricity generation would be provided by wind power. Given the continuing growth in demand for electricity, wind energy development would, at best, provide only 19% of the **new** electricity generation needed by 2020. The remaining 81% would have to be provided by other sources. Demand for coal will increase.

The National Research Council study also found that wind power development can only offset emissions of carbon dioxide by the amount that it reduces demand for other sources of electricity that emit carbon dioxide. Thus wind power can offset carbon dioxide emissions by no more than 4.5% from the level that would otherwise occur from electricity generation. At present, electrical generating units account for 39% of total U.S. carbon dioxide emissions from energy use. If the 39% value does not change, wind power development will offset only 1.8% of U.S. carbon dioxide emissions from energy use.

Additional information

The Virginia Wind website: www.VaWind.org

The National Research Council 2007 report on Environmental Impacts of Wind Energy Projects: www.nap.edu/catalog.php?record_id=11935

- - a Virginia Wind publication - -