

Wind Energy means going back to the Middle Ages

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Abstract

Is 'going back in the Middle Ages' too polemical? After all, there was no electricity in the Middle Ages, whereas wind turbines are built using the most modern technologies.

However, the natural rule of human technical progress is to always increase the available power and energy density. This historical progression began with draft animals in agriculture, moved on to medieval windmills and water wheels, advanced with the steam engine and combustion engines, and culminated in modern coal and nuclear power plants.

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1. Introduction

Never before in human history has a society shifted on a large scale to a method like wind turbines, which uses methods of much lower power than the technologies that are already established. The first person to identify a key shortcoming of wind turbines was the famous German writer and illustrator Wilhelm Busch. In a humorous poem, he described the problem faced by a miller using his windmill: *'Either there 's a lot of grain and no wind, or there 's a lot of wind but no grain.'*

*„Aus der Mühle schaut der Müller, der so
gerne mahlen will. Stiller wird der Wind und
stiller, und die Mühle stehet still.
So geht's immer, wie ich finde, rief der
Müller voller Zorn. Hat man Korn, so fehlt's
am Winde, hat man Wind, so fehlt das
Korn“*



Figure 1: A poem of Wilhelm Busch: *Either there's a lot of grain and no wind, or there's a lot of wind but no grain.*

2. Opposing views on wind turbines

Despite the obvious lack of a climate emergency, the German government and the media are nevertheless promoting wind turbines. This has confused the German people who want to protect German landscapes, birds and bats, resulting in four opposing views on wind turbines emerging in yes or no:

1. 'Wind turbines yes, but not in my backyard!' This is like the prayer to Saint Florian: 'Please

exempt my home; inflame only other houses'.

2. 'Yes, but not in forests' – these people are conservationists.

3. 'Yes, because wind turbines make decarbonization possible, and without decarbonization we will perish from global warming.' These people are misinformed, though, because the IPCC has already removed catastrophic climate scenarios, such as RCP8.5. There is no climate emergency!

4. 'No, because wind turbines destroy nature and are inappropriate technical nonsense.' These people are realists.

According to checkable calculations by Professor André Thess of the University of Stuttgart, decarbonization by 2045 with wind turbines as the central pillar will cost German taxpayers ten to the power of thirteen Euros that is, ten trillion Euros. The current Secretary of State for the Economy in the German government, Katherina Reiche, explained in an interview with the *Frankfurter Allgemeine Zeitung* that the German energy transition with wind turbines and photovoltaics costs yearly 36 billion Euros.

Is there any benefit to spending so much money? Germany is responsible for tiny about 1.5 % of global CO₂ emissions. Any reduction of this small amount has no impact on the climate, but huge detrimental impacts on the German industry. On the other hand, China, India, the United States, and other countries accounting for 85 % of the world's population are not making serious efforts to protect the climate or implement a German energy transition.

3.The fundamental wind turbine deficits

Providing energy for an industrialized country requires realizing the three points of the energy triangle, as are 'supply', 'affordability', and 'environmental safety'. Wind turbines do not comply with any of these criteria. They have three fundamental physical deficits, without any remedy.

1. The power density of wind turbines as the produced power divided by land area is too small. As a consequence, they need too much land area and construction material to produce relatively small amounts of electrical power. In simple words, their small power density is the reason for their gigantic size, waste of construction material and weight.
2. The produced power of wind turbines depends on the weather. No wind, no electricity supply from wind.
3. Modern, huge wind turbines deform landscapes and their propellers are killing large numbers of birds, bats and insects.

Onshore wind turbines in Germany provide only a power density of about 3.6 watts per one square meter of land area. This value is based on measured data provided by the German Fraunhofer Institute and the environmental agency of the German government.

In contrast to this, big coal-fired power plants provide about seven thousand watt by one square meter land area, nuclear power stations have even more.

A modern wind turbine, as the German Enercon E-126, weights three thousand metric tons. Additionally, the foundation of ferroconcrete is of similar weight, bringing the total to seven thousand metric tons. The power rating of the E-126 for maximum wind velocity of about fifty kilometers per hour is 7.6 Megawatt. Its real power, as the yearly German average onshore, is only 1.5 Megawatt. This power corresponds to ten automotive engines, each of 150 kilowatts, but weights of 1.5 tonnes instead of seven thousand tonnes.

Obviously, 7.6 megawatts for an engine with seven thousand tonnes total weight is already tiny, but there is a second mystery. Where do 6.1 Megawatts disappear, as the difference of 7.6 and 1.5 Megawatt? The reason is the physical law for every fluid-flow engine, stating that its power is proportional to the cube of the fluid velocity, here of the wind. If the maximum wind velocity is halved, the electricity yield is not 50 %, but only 12.5 %, if the velocity is quartered, the yield is

1.6 %, as practically nothing.



Figure 2: A big coal power station, shown by a blue circle, is equivalent to 2.000 wind turbines

All this is well known, but what does the German government? Because free areas with strong wind have become scarce, wind turbines are now promoted in regions with weak wind, as in forests. This stupid energy-politics combines the highest damage of the nature with the lowest electricity yields from wind.

A look at the world and also at Germany shows that, actually, the world's total energy demand comes to 85 % from coal, oil and gas. Worldwide, only 1 % comes from wind, and another 1% from photovoltaics. This is confirmed by the International Energy Agency (IEA). However, Germany's energy transition has increased this figure slightly, with 4.5 % of the country's total energy usage now coming from wind. Instead of this 4,5 %, the German media always cite 30 %. The trick is to refer only to electricity, which, worldwide as in Germany, accounts for just 15 % of total energy. The German media stubbornly never cite 4.5 %. As the desired result, nearly everybody in Germany believes that 30 % of the total energy of Germany comes from wind.

What is the reality? When there is little wind in Germany, old coal and gas power stations have to produce the missing electricity. As Katerina Reiche mentioned in her interview, this costs taxpayers a fortune every year. Even worse is having too much wind energy. Germany already has too many wind turbines, and for technical reasons they cannot simply be switched off. An excessive supply of wind electricity causes its price to fall below zero on the stock exchange. In the past, wind energy producers were compensated from the German budget in such cases. However, this policy is now coming to an end due to a lack of funding. Consequently, a multi-billion-euro international offshore wind project has failed. The days of easy profits for German wind energy companies are over.

4. Conclusion

The German energy transition, with its wind turbines, is the main reason for the current decline of the German industry. Wind- and photovoltaic electricity are too expensive and harmful to the environment. Using medieval windmills alongside photovoltaics to deliver all of Germany's electricity, and later even all of its total energy, is megalomaniacal. The historical law of constantly

increasing available power and energy density is being violated, and this is having severe consequences.

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