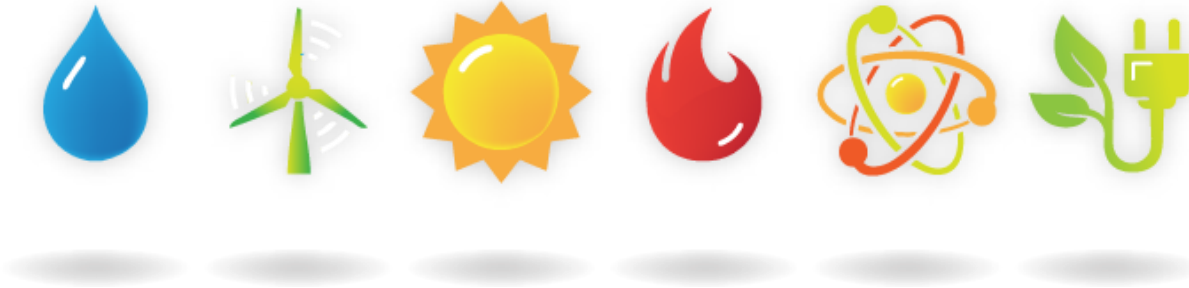


CAN WE RELY ON WIND AND SOLAR?

*Transcript of a presentation by Alex Epstein of the Center for Industrial Progress
- for Prager University - October 2015*

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Are wind and solar power the answer to our energy needs? There's a lot of sun and a lot of wind. They're free. They're clean. No CO2 emissions. So, what's the problem? Why do solar and wind combined provide less than 2% of the world's energy?

To answer these questions, we need to understand what makes energy, or anything else for that matter, cheap and plentiful.

For something to be cheap and plentiful, part of the process to produce it, including every input that goes into it, must be cheap and plentiful.

Yes, the sun is free. Yes, wind is free. But the process of turning sunlight and wind is far from free. In fact, compared to the other sources of energy -- fossil fuels, nuclear power, and hydroelectric power, solar and wind power are expensive.

The basic problem is that sunlight and wind as energy sources are both weak (the more technical term is dilute) and unreliable (the more technical term is intermittent). It takes a lot of resources to collect and concentrate them, and even more resources to make them available on-demand. These are called the diluteness problem and the intermittency problem.

The diluteness problem is that, unlike coal or oil, the sun and the wind don't deliver concentrated energy -- which means you need a lot of additional materials to produce a unit of energy.

For solar power, such materials can include highly purified silicon, phosphorus, boron, and a dozen other complex compounds like titanium dioxide. All these materials have to be mined, refined and/or manufactured in order to make solar panels. Those industrial processes take a lot of energy.

For wind, needed materials include high-performance compounds for turbine blades and the rare-earth metal neodymium for lightweight, specialty magnets, as well as the steel and concrete necessary to build structures -- thousands of them -- as tall as skyscrapers.

And as big a problem as diluteness is, it's nothing compared to the intermittency problem. This isn't exactly a news flash, but the sun doesn't shine all the time. And the wind doesn't blow all the time. The only way for solar and wind to be truly useful would be if we could store them so that they

would be available when we needed them. You can store oil in a tank. Where do you store solar or wind energy? No such mass-storage system exists. Which is why, in the entire world, there is not one real or proposed independent, freestanding solar or wind power plant. All of them require backup. And guess what the go-to back-up is: fossil fuel.

Here's what solar and wind electricity look like in Germany, which is the world's leader in "renewables". The word erratic leaps to mind. Wind is constantly varying, sometimes disappearing completely. And solar produces little in the winter months when Germany needs energy.

Therefore, some reliable source of energy is needed to do the heavy lifting. In Germany's case that energy is coal. So, while Germany has spent tens of to subsidize solar panels and windmills, fossil fuel use in that nation has not decreased, it's and less than 10% of their total energy is generated by solar and wind.

Furthermore, switching back and forth between solar and wind and coal to maintain a steady flow of energy is costly. Utility bills for the average German have gone up so dramatically that "energy poverty" has become a popular term to describe those who cannot pay -- or who can barely pay -- their electricity bills.

If those bills one day go down, the reason will not be more solar and wind energy, but lower oil and coal prices.

There's no free lunch. And there's no free energy. And that very much includes the highly expensive energy from the sun and the wind.

I'm Alex Epstein of the Center for Industrial Progress, for Prager University.

(I recommend logging on to the Prager University website and watching brief but excellent presentations on the issues facing us today. - SB)