The Oil Drum
DISCUSSIONS ABOUT ENERGY AND OUR FUTURE

A Real Time Example of Energy Quality- How Wind Turbines are Subsidized by Fossil Fuels

Posted by Nate Hagens on April 28, 2008 - 7:10pm
Topic: Alternative energy
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Global oil depletion is not immune to the Law of Receding Horizons, the Law of Diminishing Marginal Returns, nor it seems to the Law of Unintended Consequences. The Grangemouth refinery shutdown has apparently caused work on a new wind farm in Scotland to shut down for lack of diesel fuel. Though at this stage this is a short-term snafu, it's a real time example of how lack of systems analysis of our energy problem will lead to unanticipated problems.

Tomorrow we will highlight another in a series of analysis on Energy Return on (Energy) Investment. Though measuring an energy projects profit and cost in terms of energy is very important, all energy sources are not the same, and the word 'alternative' does not connote 'equality'. In effect, quality matters. Despite some attractive substitutes to oil and gas from an energy return perspective, ALL fuel sources are now heavily subsidized by an infrastructure built and maintained by cheap and constantly available liquid fuels.

In the comment section of theoildrums coverage of the Grangemouth refinery shutdown, we find that a diesel shortage has caused construction to stop on a $300 million wind farm.(hat tip to Undertow)

> MORE than 100 construction workers could face the dole after the fuel crisis brought their project to a halt.
>
> The drivers for Glasgowbased AB2000 were grounded at the new wind farm at Fenwick Moor, Ayrshire, on Thursday after contractors Morrison Construction were unable to find more diesel.
>
> The job was restarted on Friday but bosses fear the limited fuel supply will soon run out and lead to job cuts.
>
> Ted Reilly, of AB2000, said: "We have 70-odd vehicles stuck there because we are hiring men and vehicles to a contractor which can't supply diesel. That situation can't go on any longer.

This highlights an ongoing theme discussed on this website about wide boundaries and energy quality. We need energy to perform work. How we define 'work' is dependent upon how our

society is structured. A handful of decades ago, crude oil, despite being extremely powerful and right under their feet, would not have meant much to Saud tribespeople in the Arabian desert, who valued fast, healthy horses as the 'energy quality' that powered their society. Similarly, today we are utterly dependent on crude oil and its refined end products of gasoline, diesel fuel, jet fuel and heating oil.

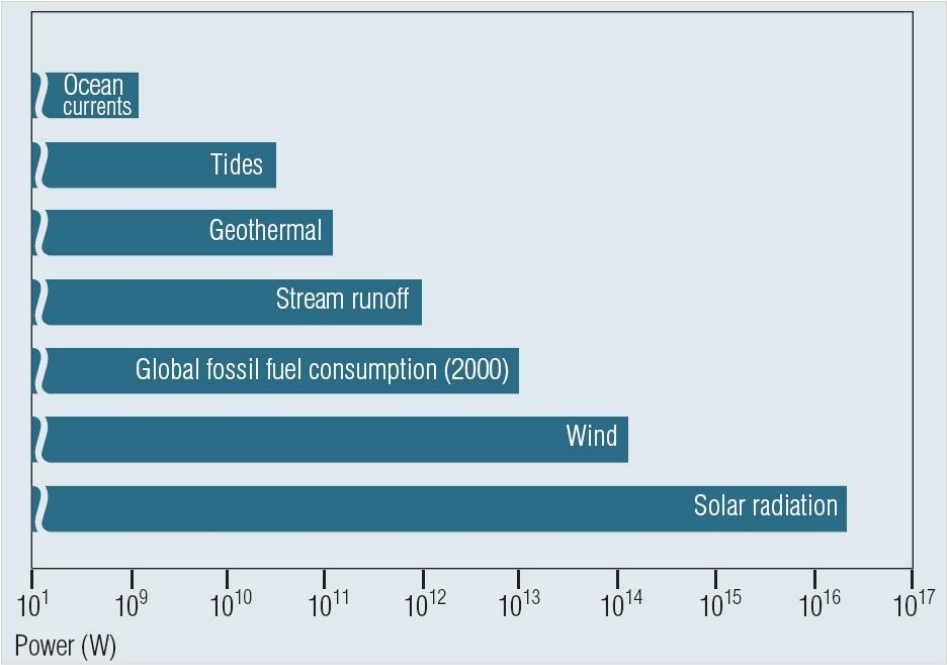

Figure 3. The global flux of fossil and renewable fuels. (Source: Smil, V. 2006. "21st century energy: Some sobering thoughts." OECD Observer 258/59: 22-23.)

The global flux of fossil and renewable fuels. (Source: Smil, V. 2006. "21st century energy: Some sobering thoughts." OECD Observer 258/59: 22-23.)*Click to Enlarge*

> Water, water everywhere but not a drop to drink

There are large amounts of solar energy hitting the planet. The potential scale of alternative energy is massive (at least when measured in its unharnessed state). It IS possible to replace a fossil fuel infrastructure with nuclear, wind, solar, hydro, etc. but we will need a 20 year headstart and a change in the demand system. Just like most people were unaware of how much systemic risk existed in the financial markets until recently, there is similar unquantified systemic risk in the energy markets. We need diesel fuel, cheaply and consistently available to move parts and components around for wind tubines and solar panel production. We need large amounts of natural gas and electricity to produce crude oil. We need well maintained asphalt roads and clean drinking water and municipal infrastrucuture to keep employees moving to their jobs at alternative energy manufacture. We need hospitals and healthy insurance companies for employees to feel secure and safe in their jobs, etc. There are many many interconnected threads within modern society that all link back to cheap oil and gas.

A great concern of mine is the likelihood of falling into the "Tragedy of the Energy Investing Commons". As the energy crisis deepens, more money, expertise and resources will be thrown at any energy alternative that produces energy, irrespective of its quality, density, energy surplus or environmental impacts. Many of these technologies will be dead ends (energy sinks). Many will produce some energy. Some will procure new forms of energy valuable to future society, and at

meaningful scale. However, all will drain resources, both liquid fuels and non-energy inputs away from non-energy society. If their energy contributions are marginal, *or of differing quality than we depend on*, this will accelerate the usage of our remaining high quality fossil stocks. The wind farm in Scotland will undoubtedly restart once the shortages are over, but this example highlights how systemic our energy systems are. If energy production/consumption was well-diversified, and/or redundant, a shortage in diesel would not lead to problems with wind turbine construction.

At what point does time become as limiting an input as crude oil? Until we can make wind turbines from wind, this civilization may be increasingly subject to Murphy's Law.

(for an excellent primer on the importance of energy quantity and quantity in human energy transitions, see Professor Cutler Clevelands Energy Transitions Past and Future)