

The Power of Energy

For many years now we have heard reports about how the quantity and quality of science being taught to students in the US has been on the decline. To most people this news is on a par with reports of tornadoes: “It’s too bad” and/or “There’s nothing I can do about it” and/or “Life will go on” and/or “It doesn’t really affect me personally.” *Next news story.*

Unfortunately, the science decline has converged with another major scourge of our time: *grade inflation*. The net affect of the product of these two problems is that the relative scientific knowledge of our **society** is in serious decline. If you have any question about the validity of this, simply ask any of your friends to explain what the “scientific method” is. (Hint: failure to follow these established norms is a hallmark of pseudoscience.)

The lack of such core understandings is a profound failing of our education system, and has lead to our current populous being, by and large, *technically challenged*.

And the “it doesn’t affect me personally” assumption is totally false, as our country is now being driven by science-deprived journalists and politicians. Major decisions about your economic well-being, and your quality of life, are being made by well-intentioned (we’ll optimistically assume that), but ill-informed people.

Science is not a static field. While **scientific methodology** has remained constant, at any time in the last few thousand years there has been a prevalent paradigm (shared set of assumptions) which was used in determining what was scientifically legitimate, and what was not. A layperson’s view would be that a paradigm explains the world to us, and helps us to predict its behavior. One of the interesting and challenging aspects of our times is that we are now going through a phenomenally profound change in our scientific paradigm.

Technology advances are one of several forces propelling this revolution. *More computing power exists today in one Apple iMac than did in the entire world around 1960!* This undeniably gives us new capability (e.g. for predicting weather). But what gets lost in the excitement of possibilities are other equally compelling facts, like the extraordinary impact that the personal biases that one computer programmer can have on our whole society.

Other negative consequences are that children have become more technically proficient, but are significantly less creative. In addition, so much of their free time is technologically oriented that their appreciation of nature often suffers. Further, students so used to “answers” being instantly available, are gradually losing their ability to do *critical thinking*. And writing? IMO, FWIW, this situation has become FUBAR. And this is *not* WOOT. SCNR.

But maybe I went too fast there. Imbedded in the prior paragraph is the most fundamental problem of our time: **the lack of critical thinking**. What exactly is that?

“Whereas society commonly promotes values laden with superficial, immediate ‘benefits,’ critical thinking cultivates substance and true intellectual discipline. It entails rigorous self-reflection and open-mindedness — the keys to significant changes. Critical thinking requires the cultivation of core intellectual virtues such as intellectual humility, perseverance, integrity, and responsibility. Nothing of real value comes easily.” A rich intellectual environment — alive with curious and determined citizens — is possible only with *critical thinking* at the foundation of the evaluation process.

Paraphrasing a quote from an Ann Rice book: “Very few really seek **knowledge** in this world. On the contrary, they try to justify their entrenched, unscientific opinions, by selectively wringing from the unknown, answers to console themselves. To *really* ask for the Truth is to open the door to the whirlwind — which may annihilate the questioner.”

This, in my opinion, is the *core explanation* for the dogged support of such non-solutions to our energy crisis (like wind power) by otherwise well-intentioned environmentalists.

The energy issue has become the poster child of what is a scientific wasteland. Everywhere one looks there is information being paraded by the media and political entities as *fact*, whereas it is really *nonsense*, or from our perspective here, *non-science*.

It's challenging to know where to begin an analysis of this issue, but let's just start with the fact that most people confuse "Energy" with "Power."

Every student *should* have been taught that "Energy" is "the ability to do work", whereas "Power" is "the *rate* at which energy is consumed." In everyday experience, home electrical "Power" is measured in terms of KWs (KiloWatts = 1000 Watts = ten 100 Watt light bulbs). *Lost already? Join the crowd.*

An analogy might be that Energy is your 60 gallon tank of hot water. Power is the water flow (e.g. from your shower, let's say 1 GPM). That energy will supply 1 hour of that power.

In a related way "energy generation" is often used interchangeably with "power generation." However, there is actually no such thing as "energy generation," because energy can not be created (due to the first law of thermodynamics — a science thingamajig). Electrical utility companies are more accurately businesses that *convert* one type of energy into another (e.g. heat energy into electrical energy). No energy is *generated* or *created*.

Let's briefly look at some of the other messages that are being fed to the unscientific public by the unscientific media. For instance: *are we running out of sources of energy?* **No.** Since energy is never "lost" that is impossible.

Are we running out of sources of energy to convert? **No,** the energy resources in the US are essentially infinite.

Will changing to another source for electricity (like wind power) meaningfully help the US reduce its dependence on foreign oil? **No.** The fact is that only about 1% of the electricity generated in the US comes from oil. Putting this in perspective, the United States EXPORTS significantly more oil than the amount it uses for electricity generation.

Is Global Warming a scientifically resolved matter? **No.** There is some very convincing evidence (and scientists) that indicate that there is such a thing as Global Warming. But there are some very qualified scientists (with good evidence) that suggest just the opposite.

More importantly, statements often appearing in the media like "the majority of scientists" believe in Global Warming, are meaningless. First of all, no legitimate survey has ever been done, and secondly, science is **not** about the number of people who advocate a position.

A good example of the latter is that up until a very few years ago essentially 100% of physicians *and* professional health organizations (world wide) believed that it was scientific fact that ulcers were primarily caused by stress and excess acidity. Two contrarian Australian scientists *proved* them ALL to be wrong. [An interesting sidelight to this story is that thirteen years after this scientific **proof** was formally released, a CDC study showed that 75% of ulcer patients were still getting the wrong treatment. *Change is resisted.*]

There are three basic positions to take about Global Warming: **1)** you believe that it is true, **2)** you believe that it is false, or **3)** you believe that the jury is still out. What is indisputable is that *the most unscientific thing you can say* is: "The debate is over."

Aren't "renewable" sources of energy a good thing? **Yes**, because ALL sources of energy are "renewable" (replaceable by new growth) — just at different rates. Please reflect for a moment on this scientific fact: **all** sources of energy are renewable.

Then what sense do such edicts as "Renewable Portfolio Standards (RPS)" make?

Absolutely none. They set artificial time periods, autocratic limits, and arbitrarily favor some selected *businesses* that have gained political support. In a word they are unscientific. Wind power is in, hydroelectric is out. Solar power is in, nuclear power is out. Geothermal, one of the best "renewables," has been all but ignored. There is essentially **NO scientific** rationale for these distinctions. It's all about politics, the money, and the lobbyists.

But aren't these political favorites "cleaner" and "greener"? **No.** Firstly because "cleaner" and "greener" are subjective, non-scientific terms, *and* the people who are making up this terminology are businesses that stand to profit from their implementation.

When you hear "clean" and "green" think Madison Ave marketing. Intentional vagueness is part of a time-tested propaganda tactic designed to elicit cooperation. These clever folks are taking advantage of Joe Citizen's scientific limitations and trying to manipulate him into thinking he is supporting a good thing. The reality is that he is lining someone's pockets.

Secondly, even using the definitions made-up by the businesses that are profiting from this political clout (that "clean and green" means that less emissions, like CO₂, are made) there are "non-renewables" that are just as clean and green.

As an example, in some state RPS edicts, hydroelectric power (zero CO₂ emissions) is not acceptable as a new "renewable." Why? Because a political group (some environmentalists) doesn't like some of hydroelectric's environmental impacts — yet they say nothing about wind power's. Again, we have a result based on politics and influence, not science.

Nuclear is another example. Its total CO₂ emissions are less than wind power, primarily because wind's infrastructure has five to ten times the amount of concrete and steel, yet wind power is marketed as a "clean and green" replacement of nuclear.

[And it has been calculated that for wind power to roughly produce the power of one 1000 MW nuclear facility, it would take some TWO HUNDRED THOUSAND acres of land... Another perspective is that if wind power was to provide the electricity needed by New York City, the entire state of Connecticut would have to be completely covered with turbines — and that assumes favorable wind conditions 24/7, which won't ever happen.]

But scare mongers (mostly non-scientists) have so far successfully overly concerned the public about the downsides of nuclear power. If we were better educated, we wouldn't be so vulnerable to misinformation, and would see the situation in a more realistic perspective.

The scientific fact is that ALL sources of power have *serious* downsides. We should be spending our time and efforts on fixing (or improving) those power sources that have the greatest real capacity to provide dependable (e.g. Base Load, etc.) power, rather than wasting hundreds of billions of dollars on those that have the strongest lobby. In other words (again) it should be about the science of this issue, not who stands to profit from it.

Still another absurdity of our times is what is known as "Carbon Trading".

Aggressively marketed as being a legitimate part of reducing emission pollutants, it is quite the opposite. The layman's definition of Carbon Trading is that a polluting utility company is allowed to continue to pollute if they buy someone else's good actions or "credits."

*But don't they have to "pay" for this? **Not really.*** As with most of these arrangements, the consumer will be the one who really has to pay, not the business. And of course we **all** are impacted (have to "pay") by the environmental harm done by these continued emissions.

*But didn't a version of this idea work for acid rain? **Possibly, but...*** firstly, there were other factors involved with acid rain reduction so it is hard to assign exactly which did what. Secondly, this is a technically different issue in many ways — e.g. it is an easy task to measure acidity changes in selected lakes, but it is a considerably more complex matter to measure CO2 variations. Thirdly, this is a much more substantial problem than harming lakes, so we need to be *sure* that it will work. Interestingly this whimsical plan is being supported by the same people who say that "the fate of the planet is at stake." What sense does it make to allow extinction of *Homo sapiens* just because a few dollars are expended?

Fourthly, the people setting up this arbitrary system have an unscientific agenda: they want to promote certain politically favored businesses (like wind power). They do this by assigning a fictitiously high "credit" to wind power, thereby encouraging investment in it. Then owners of coal utilities (who have *real* pollution) buy these monopoly money credits to get out of jail, which allows them to keep polluting — all with the government's blessing.

Because wind power credits are not realistic in the first place (since they are usually based on false premises like wind power generates CO2-free electricity, or that it replaces coal power nearly 1:1), very little benefit is done to the environment. All you have to know is that taking advantage of such boondoggles was a key part of Enron's recipe for success.

Since one bad idea often begets another, Renewable Energy Credits (RECs) are still another silly attempt to profit off of consumer's scientific ignorance and their desire to do good.

Is all this sound public policy?

Another way to look at energy is that it is a **force multiplier** that helps us do more than we could do if we used less of it. This applies whether heating your home, pumping water, creating a manufactured item, operating your computer, or whatever other function it performs. Using it wisely is important from efficiency, economic and environmental standpoints. Since its use *always* entails tradeoffs, we need to keep these in mind.

However, making all energy more expensive, or mandating *carte blanche* reductions of energy use as an **objective** (*without comprehensive and objective consideration of costs and benefits*), does **not** make sense from a societal perspective, and will be seriously detrimental to all of us.

All these ineffective and counterproductive ideas can be traced back to promotions by profiteers, coupled with misguided support by scientifically sparse souls.

The bottom line is that our energy issues **can** be solved if proposed solutions are put through time-tested **scientific methodology examinations**. Such independent analyses would objectively determine whether the new ideas (like industrial wind power) are technically sound, financially viable on their own, and environmentally friendly.

We depart from this proven path at our extreme peril.

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— Some References —

(All links should be clickable)

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All you need to know about wind power is found in the 2007 National Academies of Sciences report. The first item under “Conclusions” says that (assuming the most optimistic conditions) the US CO2 savings by **2020** will amount to only **1.8%**, a trivial quantity: <<http://www.nap.edu/nap-cgi/report.cgi?record_id=11935&type=pdfxsum>>.

For scientifically based information about wind power, see my webpage: <<<http://www.WindPowerFacts.Info>>>. Email me questions at: “aaprjohn@northnet.org”