Questionable Renewable Energy Dreams: Where Do We Go from Here?

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A Tale of Three Studies • Oil Grows in Instability and Danger As It Goes Away Geologically • Cars Are Renewable?

It was the summer that Al Gore had NASA's James Hansen testify in the Senate that human-caused global warming had begun: in August 1988 I founded Fossil Fuels Policy Action, a nonprofit institute, in Washington. We would be a clearing house for energy data & policy, with an eye to replacing fossil energy with renewable energy. Two all-consuming questions became our focus: why is the U.S. not conserving energy, and what can make it happen? This immediately morphed us from more passive "assessment" to more active advocacy, within our basic mission.

In a matter of months our solution became our raison-d'être: a Conservation Revolution. Our conclusion about the dire state of the world was seemingly affirmed by Worldwatch's 1992 initiative which followed our public announcement and publications with their very similar Environmental Revolution. It all seemed like a very big deal then, for activists and dreamers can get a bit carried away. Funding and competition for funds can come into play as well. None of us would have anticipated that nearly a quarter of a century later, now with grey hair and somewhat tired voices, we are still fighting for such a revolution or at least some meaningful, trend-altering reforms.

Prior to forming Fossil Fuels Policy Action, I had scoured the inside-the-beltway environmental establishment for a job, to put my well-known oil industry analytical skills to use for Mother Earth. It was early 1988. The only job I got was a temporary post at Renew America, formerly the Solar Lobby. What I learned from the many greenies I met around town was that they were positioning themselves for green business, in both senses of the word. Their intentions were good, but I felt somewhat repulsed by a mere industry shift. The greener establishment I glimpsed would not bring about much of a change in the nation's overall direction. Yet, I was happy enough to form a group that fit in with them, because I found some reforms exciting, and I had to create my own job under a new banner in order to participate.

My misgivings about the value and promise of a green industrial class sprang mostly from my innate, radical nature-loving. Soon after starting Fossil Fuels Policy Action, I became aware that major environmental groups were taking donations from the natural gas lobby, the American Gas Association. I had known the AGA, so I paid a visit and went out for drinks with my key contacts from my days at Lundberg Survey where I had published alternative fuels price reports for gas utilities. I left the bar knowing that Fossil Fuels Policy Action was now in line for a convenient donation: to trumpet natural gas as a "bridge fuel" for a renewable energy future. I wanted that future and was working for it, but I began to suspect it was purely utopian if the renewable energy were imagined to be on a scale to substitute for fossil fuels. I had just been sent the book Beyond Oil: The Threat to Food and Fuel in the Coming Decades to review, so I learned about the net-energy issues with alternative energy.

Instead of taking the AGA's money, I decided it was more fun to reject the donation publicly by publishing a newsletter on the competition between natural gas and heating oil, exposing the environmental groups' taking fossil fuel money. My corporate friend Nelson Hay of the AGA called me up after seeing our newsletter, and bellowed, "Are you on acid, Jan?!" And a prominent D.C. environmentalist chided me in a letter that said only, "It's all dirty money anyway."

Renewable energy should be the real deal, and not something to justify dependence on slightly cleaner fossil fuels. Today, the question has become, "How can renewable energy systems be seen for what they are and are not?" Where do we go from here, when the consumer economy with its cheap-oil built infrastructure has little future after conventional oil extraction peaked globally in 2005? One clue is that Fossil Fuels Policy Action eventually became Culture Change.

A Tale of Three Studies: Bursting Renewable Energy's Mental Bubble

Renewable energy is great, right? But what if it is mostly misused, and appears increasingly to be a false promise for preventing more oil spills like BP's in the Gulf of Mexico and for saving the Earth's unravelling climate? After a thorough and dispassionate look, at the end of this section we nail the "double Achilles Heel" of large-scale renewable energy: storage of energy during intermittency, and low net-energy return on energy invested.

Just as some of us question the wonders of "clean" natural gas -- increasingly derived from toxic fracking -- some go further, beyond embracing renewable energy, to promote and practice energy-consumption curtailment as the best form of conservation. But this usually falls on deaf ears. One reason is that there is no sexy, high-tech, start-up, dollar-signs-in-the-eyes attraction to cutting back on energy use in general. Rather, "clean tech," which is often not about cutting energy consumption, is the hot buzz word for investors and careerists -- even though curtailing energy use is the fastest way to reduce greenhouse gas emissions, mercury, smog, acid rain, and nuke-energy risks.

A near spate of exposés on "renewable" energy appeared recently. We first put out the word on two of them via Facebook and emails: What's Wrong with Renewable Energy? by Kim Hill, drawn partly from Ozzie Zehner's book Green Illusions, and
Abundant Clean Renewables? Think Again! in Truthout.org, November 16, 2014, by Almuth Ernsting of Biofuelwatch.

In these studies, as in many an article on Resilience.org (formerly EnergyBulletin.net) and CultureChange.org, the widely ignored but fatal issues involving the renewable energy technofix for peak oil and overpopulation are presented in disturbing, documented detail. The discussion is not about decentralized, small-scale energy systems for a home or farm. Passive solar and mills for grinding grain, powered with the wind or flowing water, are especially benign. Rather, the issue is large-scale systems designed to be part of the electric grid.

Ernsting asks, "Can we really put our hopes for stabilizing the climate into trying to simply replace the energy sources in a growth-focused economic and social model that was built on fossil fuels? Or do we need a far more fundamental transition towards a low-energy economy and society?" She sees the rise of wind power and solar power as serving the corporate agenda rather than human needs. She examines Germany's real energy mix, which puts solar and wind in perspective. Most "renewable" energy in Germany is from biofuels, biogas and wood pellets, none of which are innocent of causing serious environmental impacts. These three prime renewable energy supplies, and dependency on them, means that the "24,000 wind turbines and 1.4 million solar panels have scarcely made a dent in Germany's fossil fuel burning and carbon emissions."

Same for Denmark, Ernsting reports: "wind energy in Denmark accounted for just 3.8 percent of Denmark's total energy use in 2010" because electricity generation is only one aspect of energy. Again, in Denmark it is bioenergy generating far more energy than wind. Norway is a similar situation, except hydroelectric dams are the favored alternative energy. This means a set of problems for Norway that Norwegian companies are exporting, to the detriment of foreign lands.

What if the windy UK put wind turbines all over its coasts? Fifteen offshore wind turbines installed on every kilometer of the UK coastline would supply just 13 percent of the country's average daily energy use. "Generating that 13 percent of UK energy... would require wind turbines made of 20 million tons of steel and concrete - more than all the steel that went into U.S. shipbuilding during World War II. Steel manufacturing is heavily dependent on coal, not just as a fuel for the furnaces but because it is needed to enrich the raw material, iron ore, with carbon to make it stable. And concrete is hardly 'carbon neutral' either - cement (a key component) accounts for 5 percent of global carbon dioxide emissions."

Then there's solar PV panels. They are up to four times as energy- and carbon-intensive to produce as wind turbines: "Aluminum - used to mount and construct solar panels - is about as carbon and energy-intensive as steel. Silicon needs to be smelted at 2,000 degrees Celsius and materials used to replace silicon have an even higher environmental footprint. Then there's an array of highly toxic and corrosive chemicals used during manufacturing. Yet with regards to pollution, building wind and marine turbines is likely worse than making solar panels, because efficient and lasting turbine magnets rely on rare earth mining and refining. One 5-megawatt turbine requires a ton of rare earths, the mining and refining of which will leave behind 75 cubic meters of toxic acidic waste water and one ton of radioactive sludge." (Ernsting, Truthout)

Zehner gives environmentalists 10 reasons to question "renewable" energy:

(1) Solar panels and wind turbines aren't made out of nothing. They are made out of metals, plastics, chemicals. These products have been mined out of the ground, transported, processed, manufactured. Each stage leaves behind a trail of devastation...

(2) The majority of electricity that is generated by renewables is used in manufacturing, mining, and other industries that are destroying the planet. Even if the generation of electricity were harmless, the consumption certainly isn't.

(3) The aim of converting from conventional power generation to renewables is to maintain the very system that is killing the living world, killing us all, at a rate of 200 species per day. Taking carbon emissions out of the equation doesn't make it sustainable. This system needs to not be sustained, but stopped.

(4) Humans, and all living beings, get our energy from plants and animals. There is no living creature that needs electricity for survival. Only the industrial system needs electricity to survive, and food and habitat for everyone are being sacrificed to feed it.

(5) Wind turbines and solar panels generate little, if any, net energy (energy returned on energy invested). The amount of energy used in the mining, manufacturing, research and development, transport, installation, maintenance and disposal of these technologies is almost as much—or in some cases more than—they ever produce.

(6) Renewable energy subsidies take taxpayer money and give it directly to corporations. Investing in renewables is highly profitable. General Electric, BP, Samsung, and Mitsubishi all profit from renewables, and invest these profits in their other business activities.

(7) More renewables doesn't mean less conventional power, or less carbon emissions. The amount of energy being generated by renewables has been increasing, but so has the amount of energy generated by fossil fuels. No coal or gas plants have been taken off line as a result of renewables.

(8) Only 20% of energy used globally is in the form of electricity.

(9) Solar panels and wind turbines last around 20-30 years, then need to be replaced. The production process, of extracting, polluting, and exploiting, is not something that happens once, but is continuous and expanding.

(10) The emissions reductions that renewables intend to achieve could be easily accomplished by improving the efficiency of existing coal plants, at a much lower cost. This shows that the whole renewables industry is nothing but an exercise in profiteering with no benefits for anyone other than the investors.

Ernsting's and Zehner's articles are hard-hitting, short pieces and easy to read. They throw ice water on professional technofixers in the environmental movement (i.e., almost anyone getting significant funding), and dash the hopes of "progressive consumers" looking for greener ways to maintain their First World, privileged lifestyles -- if they will pay attention.

My own brief "elevator speech" on the renewable-energy technofix is that

- renewable energy systems depend on the larger fossil fuels infrastructure

- they have much lower net-energy yield than cheaply produced oil always had

- they offer electrical power only (save biofuels) and not any chemicals or materials that fossil fuels give

- renewable energy systems for replacing fossil fuels are not scalable to meet the alleged needs for energy consumption now or projected

- large renewable energy systems eat up agricultural land -- as does the soil-depleting, heavily subsidized, energy-inefficient biofuels industry. Hydroelectric power poses problems too, concerning ecologically damaging dams with their siltation that shortens the lifetime of the dams' water supply for power as well as irrigation.

These concerns have been voiced by the few for many years. The facts are obscured and suppressed, as a deluded nation and entire civilization jumped on the runaway oil train to economic collapse, following the peak of cheaply extracted oil in 2005. The virtuous belief in renewable energy for a greener future justified the delusion. Collapse-denial is perhaps more pervasive than denial of anthropogenic global warming, in part because the environmental establishment and mainstream media shrink from open discussion on the shortcomings of renewable energy as a viable substitute for the volume of oil and its many products in the consumer economy.

Hence, collapse and the eventual adjusting of the population size to ecological carrying capacity -- over-shot several decades ago -- also belong off the typical enviro group's table and off the reporter's beat. Politicians refuse to touch any of this. The almost palpable silver bullet for technological avoidance of resource-limits keeps most of us going as relatively comfortable or willing players in the struggling consumer economy.

When one questions "renewable" energy, it can appear he or she is singing the praises of the petroleum industries. No; deep-green environmentalists and proponents of simple living are not shills for the oil, gas or coal industries. Yes; it is unfair that subsidies for fossil fuels are so huge, and it is a tragedy for the climate. But this does not mean that subsidies for centralized renewable-energy systems will solve the energy crisis or prevent climate collapse.

In 2005 the U.S. Department of Energy commissioned a report on peak oil. Known informally as the Hirsch Report, it found that two decades' infrastructure-transformation completion are needed before peak oil hits, to avoid major disruption to the nation. The report found, "the economic, social, and political costs will be unprecedented." Maximized renewable energy efforts cannot change this, and would have had to come on like gangbusters by 1985 along with other major shifts. 1

Make no mistake, renewable energy systems have almost entirely been put into place to perpetuate endless growth on a finite planet.

Also worthwhile reading for understanding the true and limited potential of "renewable" energy technology systems on a large scale is
Eight Pitfalls in Evaluating Green Energy Solutions by Gail Tverberg. She gets into her subject with:

"Does the recent climate accord between US and China mean that many countries will now forge ahead with renewables and other green solutions? I think that there are more pitfalls than many realize." She concluded,

"Expectations for wind and solar PV need to be reduced. Solar PV and offshore wind are both likely net energy sinks because of storage and balancing needs, if they are added to the electric grid in more than very small amounts. Onshore wind is less bad, but it needs to be evaluated closely in each particular location. The need for large subsidies should be a red flag that costs are likely to be high, both short and long term. Another consideration is that wind is likely to have a short lifespan if oil supplies are interrupted, because of its frequent need for replacement parts from around the world."

Tverberg's eight pitfalls are:

(1) Green solutions tend to push us from one set of resources that are a problem today (fossil fuels) to other resources that are likely to be problems in the longer term.

(2) Green solutions that use rare minerals are likely not very scalable because of quantity limits and low recycling rates.

(3) High-cost energy sources are the opposite of the “gift that keeps on giving.” Instead, they often represent the “subsidy that keeps on taking.”

(4) Green technology (including renewables) can only be add-ons to the fossil fuel system.

(5) We can’t expect oil prices to keep rising because of affordability issues.

(6) It is often difficult to get the finances for an electrical system that uses intermittent renewables to work out well.

(7) Adding intermittent renewables to the electric grid makes the operation of the grid more complex and more difficult to manage. We run the risk of more blackouts and eventual failure of the grid.

(8) A person needs to be very careful in looking at studies that claim to show favorable performance for intermittent renewables.

Solar and wind power share a twin Achilles Heel: storage of energy during intermittency, and low net-energy return on energy invested. In
The Catch-22 of Energy Storage by
John Morgan of the Energy Collective, his research found

Several recent analyses of the inputs to our energy systems indicate that, against expectations, energy storage cannot solve the problem of intermittency of wind or solar power. Not for reasons of technical performance, cost, or storage capacity, but for something more intractable: there is not enough surplus energy left over after construction of the generators and the storage system to power our present civilization.

The problem is analysed in an important paper by Weißbach et al in terms of energy returned on energy invested, or EROEI – the ratio of the energy produced over the life of a power plant to the energy that was required to build it. It takes energy to make a power plant – to manufacture its components, mine the fuel, and so on. The power plant needs to make at least this much energy to break even. A break-even powerplant has an EROEI of 1. But such a plant would pointless, as there is no energy surplus to do the useful things we use energy for.

There is a minimum EROEI, greater than 1, that is required for an energy source to be able to run society. An energy system must produce a surplus large enough to sustain things like food production, hospitals, and universities to train the engineers to build the plant, transport, construction, and all the elements of the civilization in which it is embedded...