The Myths of Green Energy (The myths about the myths of green energy)

Finance is often cloaked in arcane terminology and math, but the one dynamic that governs the future is actually very simple. Here it is:

All debt is borrowed against future supplies of affordable hydrocarbons (oil, coal and natural gas).

Since global economic activity is ultimately dependent on a continued abundance of affordable energy, it follows that all money borrowed against future income is actually being borrowed against future supplies of affordable energy.

Many people believe that alternative "green" energy will soon replace most or all hydrocarbon energy sources, but this belief is not realistic. All the "renewable" energy sources are about 3% of all energy consumed, with hydropower providing another few percent. Hydropower produces more than a few % at 16.6% of the world's power and 70% of all renewable energy leaving 6.4% for other renewable sources, not 3% as stated) Hydro Power is 70% of Brazils total power

There are unavoidable headwinds to this appealing fantasy…

Reality Check

1. All "renewable" energy is actually "replaceable" energy, analyst Nate Hagens points out. Every 15-25 years (or less) much or all of the alt-energy systems and structures have to be replaced, and little of the necessary mining, manufacturing and transport can be performed with the "renewable" electricity these sources generate. Virtually all the heavy lifting of these processes require hydrocarbons and especially oil. Dams and hydro facilities have a life span of 100 + years Gas powered plants have a lifespan of about 22 – 25 years Wind turbines 20 years, solar panels 30-35 years Coal power plants 20 – 40 years Nuclear power 20-40 years. ALL of these need replacement and overall the renewable sources seem to have the advantage

2. Wind and solar "renewable" energy is intermittent and therefore requires changes in behavior (no clothes dryers or electric ovens used after dark, etc.) or battery storage on a scale that isn't practical in terms of the materials required. There are in fact a number of industrial scale energy storage devices that do not use batteries and can accumulate sufficient energy to span the gaps in wind and solar exposure, such as thermal energy storage and pumped hydro dams these technologies representing 99% of large scale electrical storage. Other technologies are on the horizon that are compact cost effective and can be used to store solar energy for individual homes.

3. Batteries are also "replaceable" and don't last very long. The percentage of lithium-ion batteries being recycled globally is near-zero, so all batteries end up as costly, toxic landfill. Not an issue, see above. This also ignores the pollution from coal oil and gas powered plants.

4. Battery technologies are limited by the physics of energy storage and materials. Moving whiz-bang exotic technologies from the lab to global scales of production is non-trivial. Again, not a valid argument, see above.

5. The material and energy resources required to build alt-energy sources that replace hydrocarbon energy and replace all the alt-energy which has broken down or reached the end of its life exceeds the affordable reserves of materials and energy available on the planet. This is not a true statement. Solar panels, for example, return their energy footprint and cost in 18 months to 4 years and have a lifespan of 30 to 35 years. In the worst case example you get 26 years of free and non-polluting energy. Compare this with gas powered generating stations which get only 20 years before suffering a similar or greater replacement cost and produce NO free energy. This statement ignores the fact that hydrocarbon facilities also have a finite lifetime and one that is in many cases much shorter and more costly than the renewable energy generators. This statement bears no validity in reality it is none other than a biased statement designed to support the big gas and oil companies – who will, one day, leave us without any source of energy. It is a fallacy to continue investing in technology that has a guaranteed limited future.

6. Externalized costs of alt-energy are not being included in the cost. Nobody's adding the immense cost of the environmental damage caused by lithium mines to the price of the lithium batteries. Once the full external costs are included, the cost is no longer as affordable as promoters claim. Since lithium batteries represent a miniscule component in the alt-energy world they are not an issue and this is a moot point. Neither does it recognize the pollution caused by oil, coal and gas extraction and pollution and once again ignores the pollution created by hydrocarbon energy production.

7. None of the so-called "green" "replaceable" energy has actually replaced hydrocarbons; all the alt-energy has done is increase total energy consumption. This is what's called Jevons Paradox: every increase in efficiency or energy production only increases consumption. Hardly a valid argument as the same would be true regardless of the source of the energy. this is a completely fatuous statement. Furthermore it ignores the many countries in the world who survive on most or all of their energy produced by renewable sources (see end of article).

Here's a real-world example: Building another freeway doesn't actually reduce congestion in the old freeway; it simply encourages people to drive more, so both freeways are soon congested. The argument in no way reduces the validity of cleaner renewable energy it only suggests that we should stop producing energy.

All Future Income Is a Claim on Future Energy

Setting aside the impracticalities of replacing most or all hydrocarbons with "replaceable" energy, the real issue is all debt service/repayment is ultimately funded by future energy. Once again this is a fatuous argument. As hydrocarbon facilities come due for replacement would you prefer to continue in the old style at considerable cost and the reclamation of NO free energy or might it be better to replace it with renewable energy such as solar panels which will provide 26 years of free energy at lower replacement cost both financially and in energy footprint, not to mention the reduced pollution?

On the face of it, future income is used to pay back borrowed money, but all future income is nothing more than a claim on future energy.

“Money” without access to affordable energy is worthless.

Imagine being air-dropped into the Sahara desert with a backpack of gold and $100 bills. You’re wealthy in terms of “money” but if there’s no water, food and transport to buy with your money, you’ll die.

The point is that “money” is only valuable if the essentials of life are available at affordable prices.

Right now the average full time wage in the U.S. is about $19/hour, and the average cost of a gallon of gasoline is $2.25. So a mere 7 minutes of (pretax) labor will buy a gallon of gasoline.

But what happens if inflation increases the cost of oil but wages continue stagnating? What happens to the economy if it takes one hour of labor to buy a gallon of gasoline instead of 7 minutes? All of the preceding presumes that hydrocarbon energy is free and renewable energy is not. I don’t begin to understand the logic, especially when all the real science shows that renewable energy is cheaper to produce and has a much lower carbon footprint (including all costs of construction from the mining pit through transportation and building on site) than hydrocarbon energy production.

The Hidden Costs of Alternative Energy

Economics claims that cheaper substitutes will appear to replace whatever is expensive, so cheap electricity will replace costly oil, or transport will switch to cheap natural gas, etc. Cheaper substitutes already exist

But these proposed transitions are not cost-free.

The cost of replacing 100 million internal combustion engine (ICE) vehicles is non-trivial, as is building the “replaceable” energy infrastructure needed to power all these vehicles. This is only true if one presumes that all hydrocarbon vehicles and power production are replaced in one single short timeframe. This completely ignores any transition time to arrive at such a conclusion. What was the length of time that it took to install the existing infrastructure, gas stations, power plants and electrical grid in the first place? 100 years or more

The true costs of “replaceable” energy have been fudged by not counting external costs or replacement costs; the full lifecycle costs of “replaceable” energy are much higher than promoters are claiming. Again an argument that is not supported by actual facts and figures and is stated in a way that allows the author to cherry pick and ignores the replacement cost of existing hydrocarbon facilities.

There are supply constraints that are also not included. For example, all the plastic in the world is still derived from oil, not electricity. (Note that each electric vehicle contains hundreds of pounds of plastic.) As does every hydrocarbon car to the same extent. The fact is that if cars are electric there is more oil to produce more plastic.

Energy in any form is not magically pliable. Just as we can't turn electricity into jet fuel, we can't turn a barrel of oil into only diesel fuel. Coal can be turned into liquid fuel but the process is non-trivial.

All of which is to say that the cost of energy in hours of labor is likely to increase, possibly by more than the global economy can afford. Once again, no figures are provided. The actual figures produced by the US department of energy would belie this statement. Nor does it consider that the increase in labour costs applies whether the energy is produced by hydrocarbons or renewable sources.

There may also be supply constraints, situations where the energy people want and need is not available in sufficient quantities to meet demand at any price. This is once again irrelevant. What would hold true in the renewable energy environment is equally true in the non-renewable environment, with the exception that one day the non-renewable resources will run out (an absolute given) whereas the same cannot be said of renewable energy

As "software eats the world" and automation replaces costly human labor, it's also likely that the erosion in the purchasing power of labor that's been a trend for 20 years will continue and accelerate. Not sure how this is in any way relevant.

Analyst Gail Tverberg has done an excellent job of explaining that it's not just the availability of energy that matters, it's the affordability of that energy to the bottom 90% of consumers. I suspect that the hydrocarbon supporters fear the ability of certain renewable energy platforms to be viable at the individual home level which would certainly REDUCE the cost of energy to the bottom 90% of the energy users and reduce the need for the large scale providers. Once again the author ignores the science that clearly shows that hydrocarbon energy generation is more expensive, over the long term, than renewable energy sources.

Central Banks Can't Print Energy

Again, "money" is nothing but a claim on future energy, because energy is the foundation of the global economy. Without energy, we're all stranded in the desert and all our "money" is worthless because it can no longer buy what we need to live. And so what is the relevance in respect to non-renewable vs renewable energy? The one thing that is an absolute is that if we depend on non-renewable resources for our energy there will come a day when there are no more resources and all the money in the world will not fix that! I'll put my money behind renewable energy sources.

Central banks can print infinite amounts of currency but they can't print energy, and so all central banks can do is add zeroes to the currency. They can't make energy more affordable, or guarantee that a day's labor will buy more than a fraction of the energy that labor can buy today.

Again, how does that relate to the arguments of renewable vs non-renewable energy? The reality is that if you give it any thought it is an argument in favour of renewable energy sources.

The global financial system has played a game in which "money" is either printed or borrowed into existence, on the theory that energy will be more abundant and more affordable in the future. If this theory turns out to be incorrect, the "money" used in the future to pay back debts incurred today will have near-zero value.

The question is: how much energy, water and food will the "money" created out of thin air in the future buy? It's not what the money can buy, but what the world can produce. If you take money out of the equation the people of the world will still continue to produce food and energy. The question of water is one of environment, most certainly NOT money.

If the lender can only buy a tiny sliver of the energy, water and food that the "money" could have bought at the time the "money" was borrowed, then it won't really matter how many zeroes the "money" will have. What matters is how much purchasing power of essentials the "money" retains. The author is missing the point. The money creates NOTHING. It is the environment that provides water and allows the people to generate food and energy. Maybe the author should spend more time being concerned about the environment than money.

Borrowing trillions of dollars euros, yen and yuan every year expands the claims on future energy at a rate that far exceeds the actual expansion of energy in any form.

This has created an illusion that we can always create money out of thin air and it will magically hold its current purchasing power for ever greater amounts of energy, food and water. This is backwards. It is the efforts of the people and the productivity of the environment that gives money its value – the value of money is the result not the cause.

The monumental asymmetry between the staggering rate of expansion of "money" — claims on future energy — and the stagnant supply of energy means this illusion is only temporary. Proper money management is not a valid argument in the comparison of renewable and non-renewable energy. In either system if you manage your money poorly you will suffer the consequences at some point. It might be argued that working towards a greater dependency on renewable energy might, to some extent, mitigate against the poor management of money (it would be hard to make the same claim for non-renewable energy).

Regards,

Charles Hugh Smith
for *The Daily Reckoning*

Costa Rica is one of the most impressive countries to look at in terms of renewable energy. It's is able to run entirely on renewable energy for

months at a time. In fact, in 2015 the country met 99 percent of its total energy needs from renewable sources alone.

Lest you think that this viable only for small nations Brazil provides 83% of its power needs from renewable sources

Albania, Democratic Republic of Congo, Iceland and Paraguay 100% renewable energy

Another 14 countries generate 75% or more of their energy from renewable sources including New Zealand, Uruguay and Norway with Austria close at over 74%

Canada produces 65% of its energy from renewable resources

USA 15%

Statistics from **International Renewable Energy Agency (official UN observer and** US Energy Information Administration. Other figures courtesy of the US Department of Energy.