

PLANET OF THE HUMANS DOCUMENTARY – A WAKEUP CALL

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In April 2020 I viewed the [Planet of the Humans documentary](#). This documentary has been contentious because it claimed that a number of aspects of green technology are not truly sustainable and the documentary upset a number of people by making some disturbing revelations about the politics behind the green movement.

Feasible processes are processes that are possible provided you have sufficient time, money, and energy to carry out the process. A viable process is capable of working successfully at a large scale over a long period into the future. Many people use the term “feasible” loosely when they actually mean “viable”. A process which is described as being feasible in the long term on a large scale should strictly be called viable.

Too many people latch onto magazine coverage of new processes which are feasible and assume they are also viable. Feasible processes might prove to be viable, but to pin one’s hopes on what is so far only demonstrated to be feasible can run the risk of pursuing dead end pathways in a transition from fossil fuels to renewable energy.

All renewable energy processes need to be examined with a critical and sceptical eye until the process has been demonstrably proven to be viable over a long period and at a large scale. A viable renewable energy source is truly sustainable in that it is able to repeatedly maintain and replace itself without the use of fossil fuels as a backup. Replacing the use of fossil fuels with renewable energy sources and infrastructure will initially require the use of fossil fuels because renewable energy is unable to bootstrap itself. However, once in place those renewable energy sources and infrastructure need to be truly sustainable without any further use of fossil fuels.

One way to examine and determine the viability of a system is to undertake a life cycle energy analysis of that process. Even then, the process might not be viable in the longer term, say beyond 200 years, when it is reliant on the mining of scarce minerals which will require greater levels of energy over time. The peaking or maximum rate of extraction of oil from the ground also applies to the extraction of minerals from the ground.

In 1973, the OPEC oil embargo resulted in sharp increases in the price of oil throughout the world. This prompted many Governments to commission research on energy. For example, the New Zealand Energy Research and Development Corporation (NZERDC) was established in 1974 and 309 research publications on issues of energy, including synthetic biofuels, were published from 1974 to 1988. Some of these studies concluded that biofuels were an alternative to oil, but these energy analyses were incomplete. The *Planet of the Humans* documentary’s casting of doubt about whether biofuels are truly sustainable has been confirmed and vindicated by more recent peer reviewed research. For example, the viability of biofuels was examined by Mario Giampietro, Kozo Mayumi, and Jesus Ramos-Martin in the 2006 publication “*Can biofuels replace fossil energy fuels? a multi-scale integrated analysis based on the concept of societal and ecosystem metabolism: Part 1*”.

The above authors stated:

“Many claim that biofuels represent a viable and desirable alternative to fossil energy fuels. This paper (the first of a series of two) provides a critical appraisal of the claim that a large scale move to biofuels is either feasible or desirable for powering the economy of a developed country.

... In relation to the future use of biomass for energy purposes it is crucial to eliminate the dangerous stereotypes currently proposed by the mass media and by those proposing the idea of farming for fuels. Biofuel is not a silver bullet solution to the actual energy crisis. The dream that everything in developed societies can remain the same by just replacing oil with ethanol from crops or plantations is very easy to sell in TV commercials but it is not feasible. It is only generating a dangerous myth in the perception of the general public.”

References in the above publication show that the viability of biofuels had been queried prior to 2006. The above publication and subsequent publications resulted in the 2009 book “*The Biofuel Delusion: The Fallacy of Large-Scale Agro-biofuel Production*” by Mario Giampietro and Kozo Mayumi.

In responding to claims made in the *Planet of the Humans* documentary, Bill McKibben conceded that he initially supported biofuels and, in his defence, he wrote ([350.org response](#)):

“Like the film-maker, I previously personally supported burning bio-mass as an alternative to fossil fuels—in my case, when the rural college where I teach replaced its oil furnaces with a wood-chip burner more than a decade ago, I saluted it. But as more scientists studied the consequences of large-scale biomass burning, the math began to show that it would put large amounts of carbon into the atmosphere at precisely the wrong moment: if we break the back of the climate system now, it won’t matter if forests suck it up fifty years hence. And as soon as that became clear I began writing and campaigning on those issues. Here’s a piece of mine from 2016 that couldn’t be much clearer, and another from 2019 in the *New Yorker* about the fights in the Southeast, and another from 2020 as campaigners fought to affect policy in the Northeast”

Bill McKibben was at minimum 10 years behind the ball park in his tracking of peer reviewed publications on the viability of biofuels and 7 years behind a publicly available book which addressed the same issue. To a certain extent, Bill McKibben deserves some flak for helping to promote biofuels before 2016 when it was known since 2006 by the better-informed research community and since 2009 by members of the public that biofuels are not viable.

We can all make mistakes. Bill McKibben's above mistake which contributed to a substantial waste of resources prior to 2016 is an example of why it is so important to base forward planning of a transition from fossil fuels to renewable energy on demonstrably proven viable processes. We do need to innovate and discover new processes, but at the same time we must keep in mind that a feasible process is not necessarily a viable process. Just because a process is possible does not necessarily mean we should adopt that process on a large scale.

Another message of the documentary was that the production of photovoltaic (PV) panels and wind turbines require the burning of fossil fuels and the mining of resources which also involves the burning of fossil fuels. Both PV panels and wind turbines require backup systems due to their inherent nature of intermittency – the sun does not always shine and the wind does not always blow. These backup systems and provision of transmission systems to the end user also require burning of fossil fuels and mining of minerals. The *Planet of the Humans* documentary provided information which is well known within the industries involved, but the documentary is incomplete as to the full extent of the problems that we face in a transition from fossil fuels to renewable energy.

The Energy Returned on Energy Invested (EROI) of energy source is the ratio of the energy provided by a source to the energy required to extract or produce that source. In the case of fossil fuels, additional energy is required to refine fossil fuels and transport the end product to the consumer. In the case of PV and wind turbine systems which produce electricity, both systems require additional energy for storage and transmission to the end user and energy for maintenance of the system during its life cycle and replacement. The EROI of the energy supplied to the end user is accordingly less than the EROI of a PV panel or wind turbine at source. There is subsequently confusion by many who claim high EROI's for PV and wind turbines. The EROI of the total system to supply electricity to the end user can be much less.

The EROI of fossil fuel reserves decline over time during extraction from the ground. It is not the depletion of fossil fuels that limits the use of fossil fuels, but the maximum rate of production which peaks after about 50% of the reserves have been extracted. The peaking can plateau for several years, and there is every indication that conventional oil started to peak in 2010. In due course, the maximum rate of production will increasingly decline. By the time the EROI of a fossil fuel reserve declines to a ratio of 1:1, it is no longer worthwhile to continue extracting fossil fuels from the ground because it requires the use of the same level of energy to extract the fossil from the ground as provided by the extracted fossil fuel. There will still be fossil fuels in the ground which could be extracted for use as a chemical instead of as an energy source. It will take energy to do this, and in the future the embodied energy contained in those chemicals will be much greater than at present.

The EROI of oil and gas at the well was greater than 100:1 in the 1930s and declined to between 11:1 and 18:1 in 2005 (Murphy & Hall, 2010). The high EROI of oil and gas supported dramatic increases in populations and consumption during the 20th century. By way of comparison, the EROI of PV and wind turbine systems at source was 6.8:1 and 18:1 respectively (Murphy & Hall, 2010).

Studies have been made of the necessary supply chains required to manufacture and maintain PV panels and wind turbines. The energy per unit of concentrated minerals for direct use in wind turbines and storage batteries will inevitably increase in the future as the most concentrated raw minerals in the ground are mined first followed by declining concentrations of raw mineral. More rock per unit of final use minerals will need to be processed over time and this takes more and more energy as the concentrations of the mineral in the remaining rock reserves decline. The peaking of oil will compound the rising energy costs of mineral extraction which, in turn, will limit the rate and scale that we can manufacture solar panels and wind turbines in the future. Researchers are well aware of the dynamics of these limits, but the general public is not.

The EROI of renewable energy is not only much less than that of conventional oil during the 20th century, but there are also limits to the viable scale of renewable energy due to the scarcity and rising energy costs of mineral extraction. The global energy per capita will be much less after a full transition from fossil fuels to renewable energy. We will have fewer energy slaves to support our life styles and life will subsequently much simpler. So far, the general public has been lulled into the false expectation that life can continue the same as before on the assumption that all we need to do is to simply replace fossil fuels with free solar energy. The true situation is even more complicated. We need to reduce our greenhouse gas emissions at the very same time as we need to use fossil fuels to transition to renewable energy and infrastructure. The only way we can do this is by diverting the use of fossil fuels away from unnecessary and frivolous consumption of goods and services towards an investment in renewable energy systems while, at the same time, reducing our total use of fossil fuels. This will require sacrifices. We have, indeed, a wicked problem to confront with no easy solutions. Whatever actions we should take to mitigate the impact of climate change, business-as-usual cannot continue.

After viewing the *Planet of the Humans* documentary, I followed up on several articles published on the Internet in response to the documentary and I read both the positive and negative comments posted by the general public which supported or countered what has been written in the articles. After doing this exercise, what struck me is that despite the flaws in the *Planet of the Humans* documentary, the end result of the responses to this documentary was a much-needed debate about what is entailed in transitioning from fossil fuels to renewable energy. More people are now questioning what are realistic expectations of a transition from fossil fuels to renewable energy.

The *Planet of the Humans* documentary is short on solutions and some members of the public regard the documentary as being nihilistic with the message that a transition from fossil fuels to renewable energy is impossible and a futile waste of resources. Nonetheless, I recommend the documentary for public screening because the general public needs to be more aware of the difficulties we face. *The Planet of the Humans* documentary serves as a necessary wake-up call.

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