Letters to the Editor

We invite readers of the *Journal of Space Philosophy* to send us letters referencing any past publication, to suggest subjects for future publication, or to submit information from anywhere in the Global Space Community. ***Bob Krone and Gordon Arthur***.

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Energetics

By Mike Snead, November 16, 2015

Dear Editor,

The Atlantic recently published an interview with Bill Gates under the title "We Need an Energy Miracle."[1] Gates publishes his own blog on topics of interest to him. On July 29, 2015, he published a blog with the title "We Need Clean-Energy Innovation, and Lots of It." This blog entry gives more insight into his views than the interview.

Gates's primary focus/concern is anthropological climate change and the alleged harm this will bring to the world's poor. As I discuss in my paper "Becoming Spacefaring: America's Path Forward in Space," the key to being non-poor is to have an elevated standard of living. To achieve an elevated standard of living requires technology and energy. The technology needed to enable a non-poor standard of living is readily available. The energy needed to apply this technology and to produce the goods and services required by a non-poor standard of living is not readily available and, because it is based primarily on fossil fuels, we are running out of it. Without concerted, effective action by the United States – its government and private sector acting together – Americans will experience energy poverty later this century.

Understanding that Gates's public musings are likely just exposing the tip of his thinking on these topics, I find it troubling that his quantitative understanding of the world's energy situation appears to be non-existent. Energy is a very quantitative topic. To live at a certain standard of living requires X energy per person on average. Multiply this by the population's size and the product is what that population needs in terms of annual affordable energy supplies to have the desired standard of living. Sum this product for Y years into the future – say to the year 2100 – and the total energy needed by that population can be reasonably estimated. If the energy supply is substantially non-sustainable – as is the case of the United States and most of the Western world – the required total can be compared to the estimated supply of affordable fossil fuels. If the tally sheet shows a positive value in 2100, then we are in good shape at this time. However, if the tally sheet shows a negative value in 2100, then energy impoverishment is coming within the lifetime of American children and grandchildren. The tally sheet for

[1] www.theatlantic.com/magazine/archive/2015/11/we-need-an-energy-miracle/407881/.

the United States shows a substantial negative value. (I discuss all of this quantitatively in my paper.) If the United States's energy security is bad, so is the rest of the world's.

As public awareness of America's precarious energy insecurity sets in, political concerns about any environmental impact of energy extraction and anthropological climate change will disappear. Coal is a dirty and smelly fuel compared with wood. Yet, when wood fuel supplies ran low in England starting in the 1200s, and in America in the mid-1800s, and coal was available, did folks prefer to keep warm with coal in the winter or be cold without dirty, smelly coal? Nearly 800 years of coal mining tells the answer.

As discussed quantitatively in my paper, there is but one sustainable energy solution for the United States and most of the world – space-based power. This is where I see a great failure in Gates's remarks. He writes as if terrestrial renewable energy will be able to lift the world's standard of living to that developed nations in a practical manner when fairly simple quantitative analysis shows this not to be the case. The only "lots of" clean, sustainable energy will be what we build in space, probably in geostationary orbit.

Many view this turning point in human civilization with alarm. There have always been those overwhelmed by circumstance and wanting to crawl into the nearest hole to hide. I view this turning point with great excitement. To maintain our standard of living, substantial new sustainable energy sources must be brought into operation. To undertake the space-based power solution to secure our energy future, the United States must become a true human commercial spacefaring nation. As a nation, we must boldly go forth to open the Earth-Moon system and much of the central solar system to routine human commerce. As we do this, the rest of the world will be able to exploit this new energy capability as well giving the world's poor the energy they will need to raise their standard of living – a goal we can all endorse. If Americans accept this challenge, this century will be quite exciting rather than the dismal existence the worrywarts want us to believe will happen. If Gates cannot now identify any comparable terrestrial solution that can be practically implemented at the scale of power production needed to replace fossil fuels, he should then be open to and endorse the space-based power solution.

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