

One aspect of the Smil book that really surprised me was the fact that photosynthesis is really not energy-efficient at all. It seems counterintuitive that the most natural process for converting energy is not very sustainable in high volume situations. The sun only gives off so much energy, and the inefficiency of photosynthesis leads me to believe that maybe the earth is not naturally equipped for such high energy use as we humans are generating. This seems to me like it cannot be true, and maybe if we used Nora Bateson's technique of transcontextualizing it, it would make more sense and be more easily understood in the larger earth system.

Transcontextualizing can help us see a person, place, thing, or issue from a different perspective. If we look at the efficiency of photosynthesis compared to coal, it seems weak and pathetic. However, if we look at it in terms of the plant system, it is almost miraculous and is completely sufficient and powerful enough to help the plant survive and thrive without being able to move or have any alternative way to acquire nutrients from food. When we think about photosynthesis and the power of the sun in general in terms of the earth's energy budget and the human use of energy today, at first may does not seem like much, but without it, the earth would not be livable. The sun gives off the perfect amount of heat so that water can exist on earth and allows us to live here in the first place. The sun's energy is used to grow plants which feed us humans as well as many many other animals on earth. The sun's energy can also be harnessed in the form of solar panels which create electricity. It also causes the rain to fall and the wind to blow and therefore contributes to the electricity gained from hydropower and wind energy. The sun also contributes in the opposite way, reducing the need for human energy use, especially electricity, by lighting the world during the day time when most people are awake. On the same note, the production of plants which take in carbon dioxide and give off oxygen help reduce the amount of carbon dioxide in the atmosphere and combat the damages caused by other "more efficient" methods of energy production such as fossil fuels. Not to mention the sun keeps us warm for most of the year, eliminating the need for energy expenditures on heat.

Looking back at the beginning of this paper, it seems very silly to question the value of the sun in the first place. OF COURSE the sun is valuable, it is the reason we are alive on earth! However, when you look at it in terms of energy efficiency, it doesn't seem all that great. Most solar panels are less than 14% efficient

(<http://www.qrg.northwestern.edu/projects/vss/docs/power/2-how-efficient-are-solar-panels.html>), and photosynthesis is only 2% efficient. This is pitiful compared to fossil fuels, or even the specialized LED lights in the vertical farms that we read about, which can make photosynthesis happen much more efficiently than the sun can. In spite of this, once I looked at it in multiple contexts, I saw that the sun is indeed amazing and definitely deserves having all of those ancient gods named for it. Even in terms of energy, the sun can seem efficient and valuable once you have a transcontextual perspective and can see it from many different angles. Everything is more complex than it seems, and as Nora said, "Perception determines survival". We (thankfully) cannot get rid of the sun, but if we were blind to it's value and decided not to use it to its full capacity or to block it somehow, we would not be long for this world (and the world wouldn't be long for us).