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Editorial

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Climbing Those Peaks

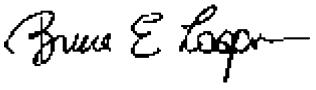
Each decade comes with new predictions about when the use of a mineral, material, or fuel will peak in terms of production relative to consumption. The first predictions of oil use suggested that U.S. production would peak in the late 1960s, and since then there have been many other highly debated and conflicting estimates of these dates for both U.S. and global oil production based on known and anticipated reserves. The trouble with the future, of course, is that it is difficult to predict. My favorite prediction, made in the late 1990s, was that oil production globally would peak sometime in 2015. I no longer recall who made that prediction or why I thought it was more accurate than the others. The fact was that I wanted to believe peak oil was near, because the greater the demand for oil, the more likely it was that oil, our main fuel, would become expensive. Maybe even really expensive. High prices for oil let me hope that more environmentally friendly and carbon-neutral methods of energy production might stand a chance of becoming economically competitive with oil, even without tax or governmental subsidies. After all, it is tough to compete with a technology where all you do is put a pipe in the ground and let one of the most energy dense and readily available fuels ever discovered on earth flow out for free. Yes, I know I am oversimplifying, but I think you see my point. Oil and gasoline have been hard to beat in terms of cost, energy density, and performance as heating and transportation fuels. But with a peak in sight, at least I could see, or rather believe, there was a point at which we would shift to other methods of energy production more environmentally sustainable than fossil fuels.

Shale gas put an end to my dream of fossil fuels ending with oil, creating what seemed like overnight a new fossil fuel peak in an even more distant future. Yes, I agree that natural gas contributes less carbon dioxide to the atmosphere than oil. Yes, it has created a lot of jobs in Pennsylvania (where I live) and the United States. But shale gas is just another "pipe in the ground" technology that continues to release fossilized carbon into the atmosphere. Development of fracking technologies has another interesting twist in our pursuit of fuels, as well. Oil fields that were once considered to be depleted can now be further tapped using fracking to provide yet more product oil. We can therefore look forward to an even higher peak in oil production, in addition to this new shale gas peak. Also, do not forget there is still a coal peak in this mountain range of fossil fuels, not to mention tar sands, and others, as well.

The next peak that I hope never to see climbed? A peak in natural gas production based on using methane hydrates. Huge amounts of methane are currently trapped in methane hydrates, or clathrates ($CH_4 \cdot 5.75H_2O$), at the bottom of the ocean. There may be more carbon in these methane hydrates than all other known fossil fuels. Right now these are tucked safely away in the ocean floor, and they are difficult (expensive!) to convert to useful natural gas. But for how long? The U.S. Department of Energy (DOE) is already funding research into extraction and use of methane hydrates. Even if the DOE does not look to exploit this resource, others will. Japan recently announced that it had found a way to extract natural gas from offshore methane hydrates. This could help fuel Japan, a country that is trying to turn off its nuclear reactors, for the next hundred years. But mining methane hydrates represents just another peak in fossil fuel production, and one that would continue to add carbon dioxide to the atmosphere.

The late Nobel laureate Richard Smalley once said that energy production is the single greatest challenge to mankind. What he should also have added was that energy production is also the single greatest environmental challenge to mankind. Every energy production technology will have environmental problems and challenges, whether it is wind mills marring the hillside, solar panels that rely on rare earth metals, or nuclear power that produces wastes we have not figured out how to safely store for thousands of years. But why continue to pursue all of these oil and gas fossil fuels that create new and ever higher peaks?

Let us all agree to stop the process by not climbing these fossil fuel peaks. Let us get serious about alternatives. What are they? It is no secret that there is not one single answer. We will need to develop a number of different approaches to reduce our global reliance on fossil fuels. We can insulate our homes and businesses better to save energy and recycle more to recover precious metals and materials. But ultimately, we must develop new technologies to meet our energy needs. Whether a car goes 20 or 50 miles on a gallon of gas, it still uses gas. We all know there are carbon-neutral technologies like those based on solar, wind, and tidal energy. What about other technologies we could use if we did not have to compete with cheap oil? What about energy from water, in the form of salinity gradients? The energy that can be extracted from river water where it flows into the ocean represents a global source of 2000 GW of power. There is enough "waste" biomass annually produced in the United States to fuel all light duty vehicles if we could turn it into hydrogen gas and use it in fuel cell vehicles. It will take a lot of work and cost a lot of money to develop and install these new technologies, but that sounds to me like a good business opportunity. The nation that sets out on the path of these new fuels will not just be the leader in the next few decades, but a winner for millennia.



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Notes

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