

Science and Society Must Meet to Resolve Energy Issues

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Ask most people what is mankind's biggest challenge for the 21st Century, and you'll get a variety of answers: disease, terrorism, poverty or having enough food or clean water. But according to experts on energy and climate-change speaking at a conference that I recently attended in Washington, D.C., our biggest challenge is finding enough affordable, low-polluting sources of energy to satisfy our growing voracious demand.

To support their point, speakers quoted Nobel Prize winner Richard Smalley who first made that assertion during a lecture in 2003. Thanks to YouTube, I found and watched his lecture – and found it to be stunning.

Though given a scant twelve years ago, Dr. Smalley's lecture pre-dated the shale gas revolution. It gives us a glimpse into how we thought about energy before the word "fracking" entered our vocabulary. More importantly, it reveals our potential energy prospects should a nationwide moratorium on fracking ever be imposed.

To Smalley, with enough energy, we can have clean water, grow abundant food, conquer disease, clean up our environment, defeat terrorism, and lift ourselves from poverty.

Smalley stated that oil and coal were the fuels of the 20th Century. If forced to rely on them to power the 21st Century, mankind will be in big trouble. Instead, we need to find oil and coal's replacement, enough to support terawatts of demand. To get to that point, Smalley asserted, we will need several "miracles," all of which will have to come from the efforts of physicists and engineers.

I fully agree with Dr. Smalley's assertion that energy remains the 21st Century's biggest challenge. However, I believe that Smalley's assertion that physicists and engineers will lead us to the path of energy salvation failed to account for one other factor: that some elements of society will find fault with every energy solution that is offered. Until we find a way to get science and society to work together on energy issues, our efforts to find a solution will be stymied.

Many energy experts today would argue that we have indeed found the "oil of the 21st Century" in the form of natural gas derived from shale. According to government data, we are now harvesting 10 trillion cubic feet of shale gas each year, representing 10 quadrillion BTUs. If my calculations are correct, that is equivalent

to the electrical generating power of 700 million tons of coal. By comparison, the U.S. extracted 1 billion tons of coal last year. So ending shale gas would force us to increase our coal production by 70%, if we wanted to go that route.

The last decade has seen rancorous debate on energy issues. Some originates from those who abhor energy development in their backyards. Others deny that man-induced global climate change threatens our health, safety, natural ecosystems, and oceans.

In northeastern Pennsylvania, we have seen proposed windfarms go down to defeat by locals concerned by perceived aesthetic, ecological, and health issues. Likewise, the emergence of fracking has led to the formation of a steadfast opposition by those convinced that gas wells and pipelines inevitably threaten their water supplies, personal health, and safety. Recent opposition to the proposed PennEast pipeline is a perfect example.

Beyond northeastern Pennsylvania, protests over nuclear energy have dramatically slowed revitalization of that industry. Groups opposed to mountaintop mining for coal in central and southern Appalachia have launched initiatives to end that practice. Those who love to see rivers run free advocate the dismantling of dams that provide hydroelectric power. And some are skeptical over the construction of more high-tension lines and a “smart grid” to more effectively deliver electricity.

Locally and nationwide, the greed of energy companies is used as a reason to stop energy development projects.

Unfortunately, all known energy sources have their drawbacks that should be identified and minimized whenever possible. And conservation is an important part of the solution. But clearly, we need new energy sources and new ways get the most out of every watt if we are to survive and prosper in the 21st Century. Developing those new sources and conservation strategies will require that they be both technically effective and embraced by society. Too often, the energy industry focuses on the first part, and neglects the latter.

Conversely, society must appreciate that our energy enterprise represents a complex, evolving system with many components and difficult choices based on some uncertainty. Thus, we must view energy issues with an open-minded, systems-approach – a point also made at the Washington, D.C. meeting. That means working collaboratively, supporting research, being honest about risks and benefits, and lifting our vision beyond single energy sources and our own backyard.