Peak Everything: What, Me Worry?

by Dana Visalli

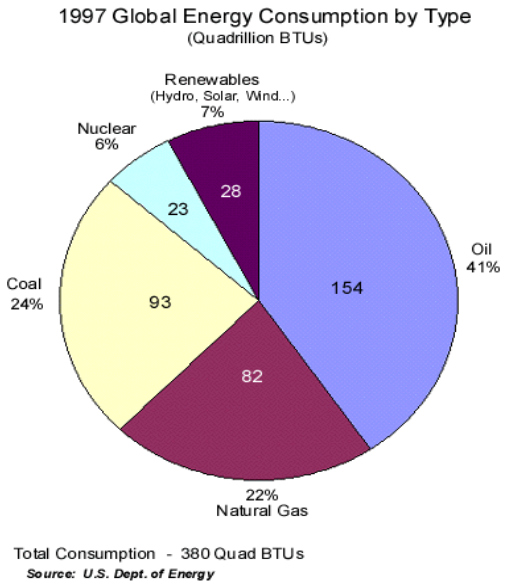
Humans appear to be programmed by their genes to see the world as it isn't. What support is there for this claim? One piece of evidence is the tendency for people to believe that growth can go on forever on a finite planet. For example, the economist Julian Simon once stated that "there is no theoretical limit to the number of people the world can support." On another occasion he announced that, "The earth can support an ever-growing human population for seven billion years" (in fairness to Simon, he later amended that estimate to seven *million* years). Similarly, many of us cannot imagine that our energy resources might someday run dry, or that the earth's atmosphere could be affected by the invisible gases coming out of a mere eight hundred million automobile tailpipes. Ecologist Hazel Henderson observed that because so many people fail to recognize the physical limits of our finite planet, modern economics has become "a form of brain disease." As a preventative measure against contracting such a disease, it might be useful to review the actual status of our energy and our atmosphere.

Where does human society get its energy? Take a guess.....and then check the chart to the right: 40% comes from oil, 24% from coal, 23% from natural gas, and 6% from nuclear (most of the 7% "renewable" listed is hydropower).

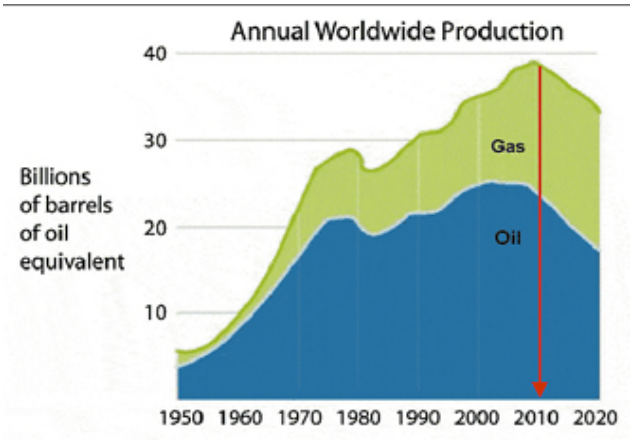
How is the world's oil supply doing? United States production peaked in 1970; we have about 15% of our original endowment left. There is much controversy about when the world will peak, but it will be soon. In fact, a global peak did occur in March of 2006, and production has declined since then. This is one of the reasons that the price of oil has gone up so dramatically. The peak of any critical resource is more important than the point of complete exhaustion, because after peaking supply can no longer meet demand, and economic growth ceases.

Here's where the mind starts playing little tricks. "Abundance," it thinks. "That which was abundant yesterday will be abundant tomorrow."

But, as you shall see, we have some big issues with future energy supply. The first place the mind goes to escape peak oil is to the oil sands in Alberta, the oil shale in Colorado, and the heavy oil in Venezuela. The basic problem with these is that they are nothing like conventional oil. They give back little



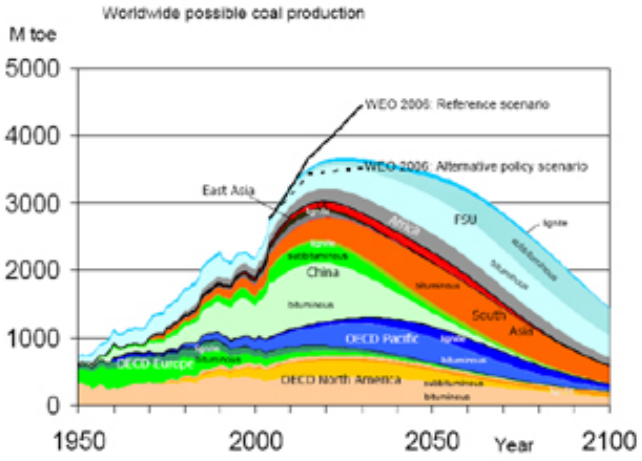
Dana Visalli works as a biologist and naturalist.



or no energy after requiring so much effort to mine and process them.

"Fine," says the self-protective reptilian brainstem, "We will just have to make do with natural gas and coal." But as fate would have it, natural gas production peaked in North America (the US, Canada and Mexico combined) in 2005, and is forecast to peak worldwide by 2020 (see graph above). In addition, natural gas is hard to transport across oceans (it is shipped as liquified natural gas, or LNG), and China has been busy buying up most of that which is available.

"Coal?", wonders the little reptile in our brains. A common statement about coal is that, "the United States has a 200 year supply at current levels of production." This is misleading on two counts. First, if oil and gas are peaking, then we will want to increase coal production, which will diminish reserves much more rapidly. Second, all the best coal has already been mined; what remains is of inferior quality, is more deeply buried, and returns less energy than the shiny black stuff we have burned for the last 300 years. A study released last year reassessed global coal and predicts production will peak within 20 years (see graph below).



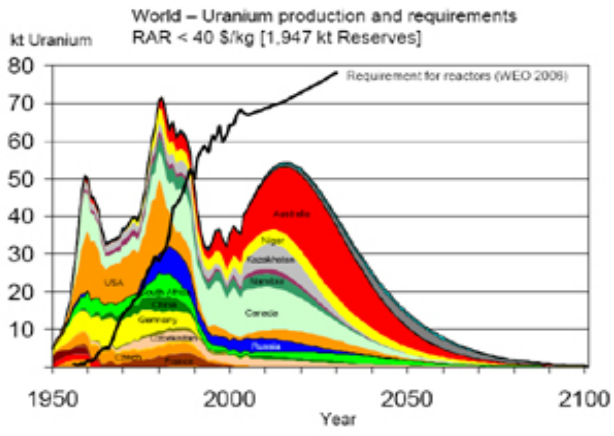
Global coal production will very likely peak in the next 30 years. All the world's best quality coal has already been mined.

The energy refuge of last resort for our little pet lizard is nuclear energy (graph below), which was once thought to be "too cheap to meter." Proponents of nuclear energy like to point out that there is uranium in everything earthy, from granite to sea water. This is true enough; the hitch is that it is far too dilute in most substances to extract. The primary source for uranium for reactors is sandstone, where it can be found in concentrations from 1% to less than 0.01% (one hundred parts per million). Below this lower concentration, it takes more energy to mine and mill than is returned in the reactor. And as might be expected, the heaviest concentrations were mined first; we are now licking the plate on uranium reserves, with only enough proven reserves known to run current reactors for 40 years.

This short review has necessarily been simplistic, and one can argue for a few more or less years for any one of these energy resources. The primary point at the moment is that the tendency for the human mind to assume that the abundance we know today will automatically be available tomorrow has blinded us to the fact that *all* of our primary energy sources are in or near permanent decline.

This simple fact means that we are at a pivotal point in human history, in part because most of the food for the 6.5 billion people on the planet requires oil and gas to grow it, and much of our electrical production requires coal.

Once you see the situation for what it is, it is both frightening and fascinating. In the next few years our world is going to change dramatically and irrevocably. There is no new source of concentrated energy waiting in the closet or under a mountain to bail us out. We are going to be challenged to live on the energy that arrives daily from the sun, and to live within the carrying capacity of our ecosystem. This has been the norm for life on earth for the last 3.8 billion years, so we should be able to figure something out.



Global uranium production did reach a peak in 1980 and then fell rapidly. The white area under the black "demand" line represents uranium supplied by reprocessing nuclear weapons.