The Oil Drum: Net Energy

Discussions about Energy and Our Future

Energy Tomorrow interviews David Murphy on Economic Growth

Posted by David Murphy on October 25, 2010 - 10:45am in The Oil Drum: Net Energy
Topic: Economics/Finance
Tags: american, american petroleum institute, david murphy, economics, eroi, growth, institute, m. king hubbert, oil, peak oil, petroleum [list all tags]

At the most recent ASPO-USA conference, I gave a presentation as part of a panel hosted by The Oil Drum. The subject matter of my post was taken from a recent paper developed by Charles Hall and me on peak oil, net energy, and economic growth. A much abridged version of the paper can be found in this post.

After the conference, Jane Van Ryan from the American Petroleum Institute (API) asked to interview me for her weekly podcast for the Energy Tomorrow blog. You can listen to the interview by clicking below, or alternatively, I have copied the transcript of the interview below the fold. The interview is 15 minutes long for those who would like to listen.

The Oil Drum recognizes that API (and hence Energy Tomorrow) is funded by the oil and gas industry. But the interview here relates to my research, which is not funded by such interests. I think the interview serves a useful purpose, because it makes my work accessible to a wider audience. *In the interview that follows, items with no name attached are made by Jane Van Ryan of API, for the Energy Tomorrow blot.*

00:16 Last week, I had the pleasure of attending the Association for the Study of Peak Oil & Gas (ASPO) National Conference in Washington, D.C., where professors, geologists, economists and

physicists gathered to discuss the possible repercussions of the world's reliance on oil and other fossil fuels. One of the speakers, Dave Murphy, a graduate student from the State University of New York, presented a paper about oil and its relationship with the U.S. economy. Dave is on the telephone with us today to explain his findings.

00:52 Dave, before we begin, I need to make it clear to our listeners that your views do not represent those of API's and your conclusions are those of you and Dr. Charles Hall, who coauthored the paper with you. I also want to mention that you're contributor to The Oil Drum, which is a very well respected blog that deals with the issue of peak oil. Can you provide a brief explanation of peak oil to our listeners?

01:19 Mr. Murphy: Peak oil is a concept that has been around since 1956 when M. King Hubbert published a paper on the topic. In very basic terms, it just says that for any nonrenewable resource, like oil, coal or natural gas, production is going to begin at zero and end at zero and at some point reach a maximum. It's really about flow rate. The idea of peak oil is that at some point on earth we will be producing the maximum amount of oil per day that we ever will. A lot of the time the message of peak oil gets muddled and the focus is driven on a specific date, and that's not really what the peak oil movement is about. It's just about measuring when, in general, oil production will reach a maximum, not necessarily a specific day.

02:14 I know that some people associate the reducing flow of oil to geology, but then there are others who associate it with energy return on investment (EROI). Can you tell our viewers what that means?

02:28 Mr. Murphy: EROI is similar to its economic analog, which is return on investment (ROI). The idea is that you have a cost of getting a resource and hopefully you input that cost and you get some oil out. EROI is simply the energy produced from an energy extraction process divided by the energy you put in. We add up the cost of building the rig, the diesel fuel used on a rig, and what you get is a ratio of energy out divided by energy in. That number is essentially a measure of quality. It's an efficiency calculation, but you can understand it as a measure of extraction and how difficult that extraction process is. Historically, if you look back at East Texas and see a lot of the big oil fields in the United States, the EROI was very high. Today, it's obviously a much more complicated industry. For example, deepwater platforms cost billions of dollars and the wells are much deeper. The energy input has grown a lot. In general, EROI is this measure of extraction quality and how that changes over time.

04:10 Let's turn to your paper, which asks a critically important question, whether a return to a growing economy is possible in light of concerns about peak oil and the dwindling supply of oil. One of your findings was that affordable energy is very important to the economy. Can you explain that?

04:32 Mr. Murphy: We looked at the economy over the past 40 years. Before I get into that, when I talk about a "growing economy," I'm specifically talking about growing GDP, which is the most popular measure of the economy today. I'm really talking about growing GDP 2, 3 or 4 percent per year over the long term. We looked to see the causality between energy and economic growth and we found that oil is the primary driver of economic growth. We live in the age of oil. It is the most important energy resource for the economy currently. We looked at the supply and the price of oil and our research shows that it's not just oil that is essential to our economic growth, but that oil has to be provided at a cheap cost. I'm talking about oil, but obviously coal and natural gas are important as well. Energy, in general, has to be affordable for

economic growth. We looked at the last 40 years and there are a lot of figures I could go over today, but most importantly, every major recession, including 1973, 1980 and 2008, was preceded by a spike in the price of oil. Granted the first two were caused by geopolitical events, but a spike of oil nonetheless. As the price of oil increases, the cost of pretty much everything in the economy goes up because oil is so ubiquitous. It's used to make plastics, pharmaceuticals, you name it. Oil is involved in the manufacturing, industrial and transportation sectors. Oil prices go up, discretionary income goes down, people stop spending money and that inhibits economic growth. That's the big finding from our research.

07:00 I think this goes back to an earlier statement you made that many people believe the easier oil has all been found and that the remaining oil is going to cost more to produce. What does that mean for the economy based on your research?

07:14 Mr. Murphy: This is one of the conclusions we came to. I have a graph where EROI is on the x axis and price is on the y axis and essentially shows that the low EROI resources cost less money to produce. Our research shows that the places where we're finding oil most recently, for example, in 2005 more than 50 percent of the oil discovered was in ultra deepwater areas, and are the areas that cost a lot of money. The price needed to maintain production in these areas is indicative of the average price of oil during recessionary times over the last 40 years, which is around $60 per barrel. If you average the price over every expansionary period from 1970 to 2008, the price of oil is roughly $37 per barrel and that is a lot cheaper than today's prices and the cost of production in the areas where we're finding oil, which is above $60 and some of the estimates for oil sands production are around $80 per barrel. Clearly, where oil production is trending in the future is in a higher price environment.

09:20 Oil prices are hovering around $83 per barrel today. How would you describe the situation we're in right now?

09:27 Mr. Murphy: Tenuous is how I would put it.

09:30 At the ASPO conference you also said that this recession, the one that we've just been through and that some experts say we're climbing out of, is quite different than previous recessions because the EROI is low, and you're indicating that with what you're saying about prices. How is that going to affect economic growth?

09:53 Mr. Murphy: I find it very hard to believe that we're going to have economic growth like we've had over the last 40 years for the next 40 years because there's a perfect storm in this last recession of maybe reaching peak oil, but nonetheless we were in a restrained oil environment for four years. Whether or not the peak occurred, let's forget about that question. Let's just think about whether oil production was constrained, meaning that demand was outstripping supply. Then we ask whether we can produce more oil. Yeah, we're producing more oil, but it's from these high costs areas. Even if we can increase physical supply, it's going to necessitate a really high price. The outlook for growth in the future is going to be different in some way than the past 40 years.

11:14 What do you think about what the administration and Congress are considering? They've been looking at policies that would raise the cost of energy through taxes or environmental regulations. How could that impact the economy?

11:27 Mr. Murphy: There's two ways to look at the situation. First is from the objective

standpoint. Higher energy prices, specifically oil, have led to recessions in the past and there's no reason to think that we can pull out of the current recession if we taxed oil so that the price is above $100 per barrel. Higher oil prices do inhibit economic growth. The other side of the coin is whether or not there are larger concerns such as climate change and if the powers that be deem those concerns to be more important than economic growth in the short-term or long-term then maybe the taxes are warranted. I'm not one to make a decision on that, but I would probably go another way and say maybe we need to start looking at a different metric of economic performance. GDP is a measure of production within the economy; it's not a measure of human well-being. If we can somehow get it through that we don't necessarily need to pursue economic growth every year, maybe we can have the best of both worlds.

12:44 That's an interesting observation. Let me ask you one final question. There are some observers that say higher costs are necessary to pave the way toward new forms of energy. Based on your research, substituting one form of energy for another does take time. Can you tell our listeners how long you think that takes?

13:03 Mr. Murphy: It takes decades. We're talking primary energy sources. There was research done by Marchetti in 1977 and he looked at substitution among different forms of primary energy, whatever the primary energy source was at the time. He found that it takes decades, 50 or 100 years, to substitute for a primary energy source. Having to substitute out the infrastructure for our oil economy will take decades. The Hirsch Report in 2005 concluded the same exact thing. In general, alternative energy sources have been higher priced than the fossil fuels. A higher fossil fuel price will allow for more easy substitution, but I don't know how that's going to happen.

14:28 And there's a human cost there, too, in terms of jobs and affordability for American consumers.

14:36 Mr. Murphy: There are costs with doing anything. It's clearly going to take a long time. There's not an overnight solution to this.

14:52 Very interesting discussion. Dave Murphy, thank you for sharing your research with us today and for joining us on Energy Tomorrow Radio.

This work is licensed under a Creative Commons Attribution-Share Alike 3.0 United States License.