

CATEGORIES: FUTURE OF OIL, HEATING OIL, WORLD

Peak Oil: A Breakdown

Is oil a limited resource?

Yes. Oil was produced from the remains of prehistoric animals. (That's why it's called a "fossil" fuel.) Specifically, most oil was produced from organisms which lived between 100 and 150 million of years ago. Since there were only so many organisms living then, only so much oil could have been produced from them. Once it's used up, there's no more.

Are we going to run out of oil?

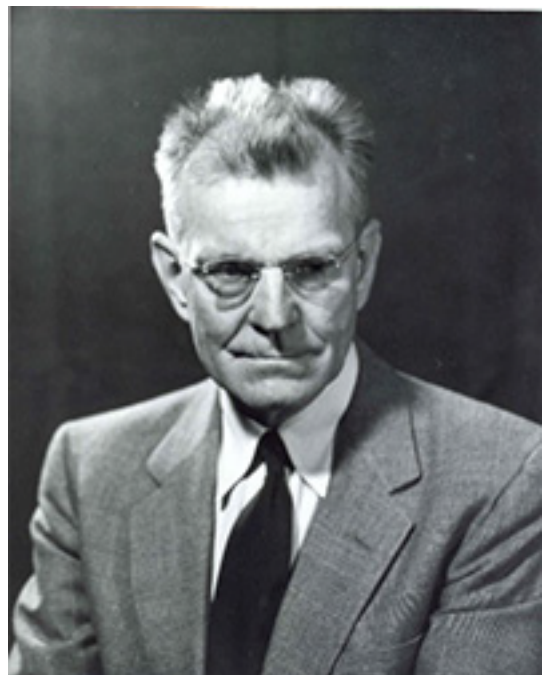
Maybe—some people say yes, some say no. And among those who feel we will run out one day, there is considerable difference of opinion about when. And "when" is the real question anyway; for example, Earth's Sun will one day expand into a red giant and swallow Earth, but since that's not for 5 billion years, nobody gets upset about it—the when is more important than the whether or not.

Peak Oil Theory—A Primer

Peak oil refers to when oil production "maxes out"—when the world is producing the most oil per day that it ever will. After that, it's all downhill, and oil production will decline. However, "downhill" is not the same as "over and done"—peak oil is not when oil is depleted or used up, but when we start pumping less out of the ground. There will still be oil for years after that, but assuming a reduction in supply will increase cost.

Most studies or theories of peak oil are built on the work of Dr. M. King Hubbert, a Shell geoscientist who did most of his work in the 1950s and '60s. The Hubbert peak theory, which says that for any limited resource, production follows a more-or-less bell-shaped curve (below left).

- Production starts at zero—nobody knows the resource is there, or what to with it
- Production climbs, as people start extracting and using the resource
- Not all of a resource is equally easy to exploit—some is located in less accessible places or costs more to dig up; the "easy" or "cheap" material is taken first

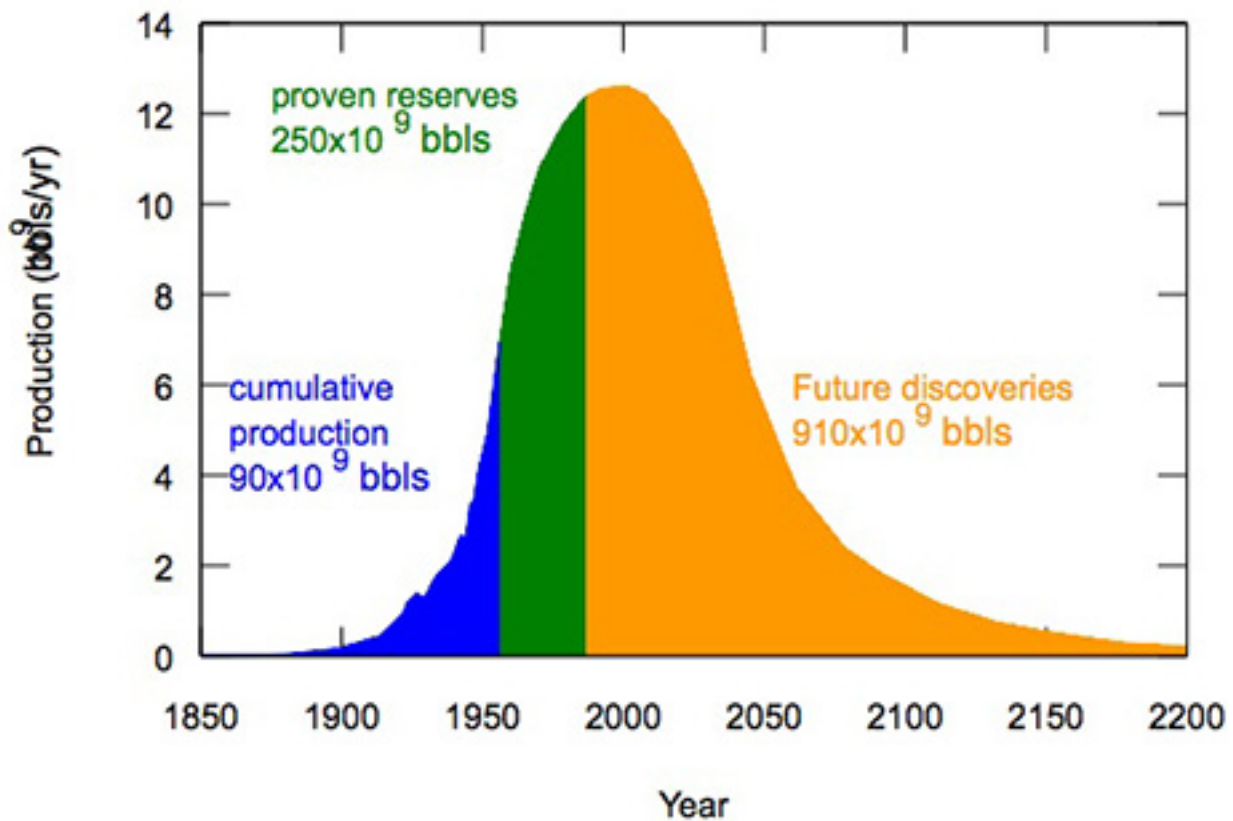


M. King Hubbert, the father of Peak Oil theory. (image: laugalaekjarskoli.is)

- As the last of the easily available resource is mined, the peak or top of the bell is reached
- After that, as more difficult or expensive sources are tapped, production starts decreasing
- Eventually (in theory) all of a finite resource is used up and production goes back to zero

Hubbert felt that one day, oil production would peak and then decline. In fact, according to his work, we should be peaking more-or-less now, sometime around the early 2000's.

Not everyone believes in peak oil. There are scientists and economists who think it theory doesn't give enough weight to advances in technology that will increase oil supply and reduce demand. They also feel that the theory is too inflexible in its assumptions. For example, it assumes that the demand for oil remains constant or grows even as price increases, instead of assuming that supply, demand, and price affect each other in a constant feedback loop.



The Hubbert Curve. (image: wikimedia.org)

Not everyone believes in peak oil. There are scientists and economists who think it theory doesn't give enough weight to advances in technology that will increase oil supply and

reduce demand. They also feel that the theory is too inflexible in its assumptions. For example, it assumes that the demand for oil remains constant or grows even as price increases, instead of assuming that supply, demand, and price affect each other in a constant feedback loop.

Why is Peak Oil a Cause for Concern?

Let's assume that peak oil theory is correct. Since even after we peak, there will still be years and years of oil in the ground, why is peaking such a problem?

After the peak, we will have less of the cheap, easy oil on which Western civilization and our modern economy is based. For example, without cheap gasoline from cheap oil, could we have suburbs? Low-density, spread-out suburban living is based on driving. Remember the summer of 2008, when gas prices were high? If they stayed that high (or higher) all the time, could people afford to drive 40 miles each way to work, or 20 miles a day around town doing errands? Expensive gas could result in people abandoning the suburbs and that's just one effect. Whether it's the use of oil to make asphalt or plastics, or the global interdependence of trade that requires goods to be shipped world-wide, our society is built on cheap oil.

Today's Conventional Reserves, Production, and Consumption

Unless—and only to the extent that—there are cultural or technological changes which reduce consumption, the demand for oil will grow year after year. The world population keeps growing—it's projected to grow by 1.167% in 2009, which doesn't seem like a lot until you realize that adds around 80 million people. Also, the two most populous nations, China and India, are becoming more affluent, which means more cars, more trucks, more roads...more of everything that drives oil consumption. Their oil consumption is growing much faster than in the Western world—though the current global recession may slow that.

Forgetting about population and oil consumption growth for a moment, if you look at a just a snapshot of estimated oil reserves vs. oil consumption, you get:

- Estimated world conventional oil reserves: 1,300 billion, or 1.3 trillion, barrels
- Current world oil consumption (or usage): around 31 billion barrels a year (based on 2007 data)

So, how much longer will conventional oil reserves last at the current rate of usage? Divide 1,300 billion by 31 billion and you get 41.9. If nothing changes—no major new sources of oil or technological advances, but also no significant growth in oil consumption—there's around 42 more years of oil left. Of course, it's never the case that nothing changes—population grows, technology improves—but unless there's a lot more oil out there, at some point, a peak followed by a decline is reasonable to expect.

Other Evidence of Peak Oil

Oil production from individual wells, fields, and even countries has been seen to peak, then decline. Hubbert predicted in 1956 that U.S. oil production would peak between 1965 and 1970—and it did. Mathew Simmons, the chairman of an oil and energy investment bank as well as a leading consultant on peak oil has collected data supporting his belief that the peak is right around the corner—if we haven't hit it already. For example, from 1997 – 2006, oil production in over twenty nations declined, and production at a number of oil fields have shown the sort of peak curves that Hubbert predicted. The U.S.'s largest oil field, Prudhoe Bay in Alaska, peaked in 1989 at 400,000 barrels a day, and has since fallen 73 percent. Since "world oil" is nothing more than the sum of every nation's oil—which itself is the sum of all of a nation's oil fields, which themselves are the sum of their individual wells—then if individual wells, fields, and nations can peak and decline, that is evidence that world oil, too, can peak and decline.

Arguments Against Peak Oil

Part of the problem is that disproving peak oil is like proving a negative—you can't really prove that oil won't peak sometime. As Simmons has observed, you can only know the peak when looking backwards in time.

The main arguments "against" peak oil don't disprove the basic idea of peak oil—that there's a limit to oil production, and one day we'll meet it—but dispute the timing and the consequences of the peak. The credible arguments affect the when and the what then, but don't really get to the whether. The credible arguments come in two flavors—

- there's more oil out there than are counted in current reserves
- technological and social changes will reduce oil usage

Before getting to them, let's tackle an incredible argument—and by "incredible," we mean "not credible," not "amazing."

Abiotic Oil Theory—Is the Earth a Perpetual Oil Factory?

According to abiotic oil theory, oil is produced by chemical and geological processes deep underground, and NOT from the remains of ancient lifeforms. (The prefix "a" means "not" and "biotic" means "life," so "abiotic oil" is "oil not from life.") This theory's strongest proponents were Russian and Ukrainian geologists in the 1950s and 1960s, though more recently, a prominent Cornell University scientist, Thomas Gold, argued in favor of abiotic oil.

There is evidence cited for abiotic oil, but for every argument, there is a counterargument. Suffice to say, the majority of geologists do not believe in abiotic oil. More importantly, it just

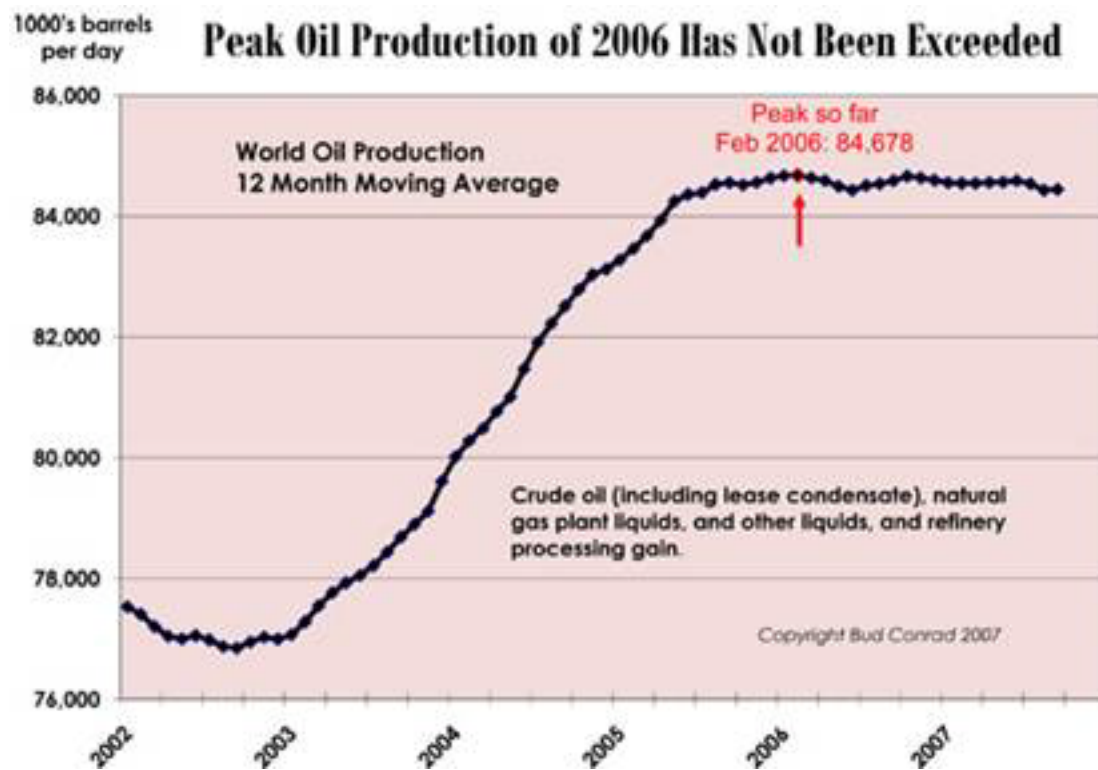
“undulating plateau,” in which supply and demand more or less balance each other.

Is There a Consensus Opinion?

No, though our own Department of Energy predicts that world conventional oil production will most likely peak in 2037 and then decline.

The DOE believes this prediction is fairly conservative, and it’s on the lower end of a range of “peak dates” (which vary by the exact assumptions made about oil reserves and consumption) that the department believes are credible, ranging from 2021 to 2112.

Of course, even though the DOE feels that its estimate is conservative, some people feel it’s overly optimistic. Simmons, for example, thinks world oil production peaked in 2005 or 2006.



(image: eia.doe.gov)

Of course, despite Simmons’s own admission that you only know the peak when looking backwards, he’s assuming that the only cause of a recent flattening of production is the dreaded peak, instead of it possibly being due to some or all of the following:

- Political actions, such as Venezuela’s nationalizing private production
- Economic decisions, such as when OPEC nations reduce production to support oil prices

- Natural disasters, such as Hurricane Katrina or Hurricane Ike

What's the bottom line? We don't know for sure, though the DOE's prediction of a 2037 peak hangs together with our earlier, back-of-the-envelope calculation that if nothing changes, we'd expect to run out of conventional reserves—the easy-to-find, cheap-to-use oil—in another 40-plus years, or around 2050.

Soft Landing vs. Hard Crash

The REALLY BIG QUESTION is, "What does a peak and decline in oil production mean?" As with the debate over the whether and when of the peak, there's no agreement on what will happen next. Depending on your assumptions about human nature, society, and technology, predictions run the gamut from:

- A Malthusian crisis in which society collapses. People go cold and hungry, until they start eating each other and burning books for warmth. Think Mad Max, but less cheerful. (If you want to read some of the most dire predictions, try lifeaftertheoilcrash.net, dieoff.org, or the work of Jim Kunstler.)
- A long-lasting global recession, in which society goes on, but economic opportunity and security are limited. It's a stable but somewhat bleak and dystopian future. Think Blade Runner, but without Daryl Hannah as Pris.
- Nothing much—as the price of oil rises, it encourages a combination of conservation, discovery of new fields, technological advances that make unconventional oil practical, and development of new energy sources. We meet the challenge, rise to it, and master it. Think Star Trek—no warp drive or transporters yet, but a sort of forward-looking, can-do world.

This last notion—that peak oil will happen, but will be more of a hiccup than a heart attack—is based on the idea that as a resource becomes scarce, technological advances and behavioral changes accommodate the scarcity. It's based in part on the work of economist Robert Solow and his theory of "back-up resources"—that when one resource runs out, society finds another. It may also have precedent: some people believe the West already met and conquered its first energy crises in the late 1500s. Wood had been the fuel of choice through the 1500s; however, as England's population grew, the island nation started facing a "peak tree" problem. Large parts of England were becoming deforested, and the price of wood was soaring. Did England's economy come crashing down? No—England began using coal, which not only averted a "wood crisis" but also made possible the Industrial Revolution.

The idea is that what happened before will happen again, and the world will navigate an oil shortage the same way. That's not to say there's no need to worry, or that that we shouldn't conserve resources while investing in alternate or unconventional fuel technology...but it

does suggest that there's no need to figure out which neighbor you'll eat first when civilization collapses from oil starvation.

This article was posted on **Tuesday, July 21, 2009 at 2:58 pm** and is filed under *Articles, Future Of Oil, Heating Oil, World*

To read more articles like this one visit HeatingOil.com.

Canal Street Station Box 1547

New York, NY 10013

© 2009 HeatingOil.com LLC