



Peak Oil - Whom to Believe? Part One - "There's Plenty of Oil, CERAiously"

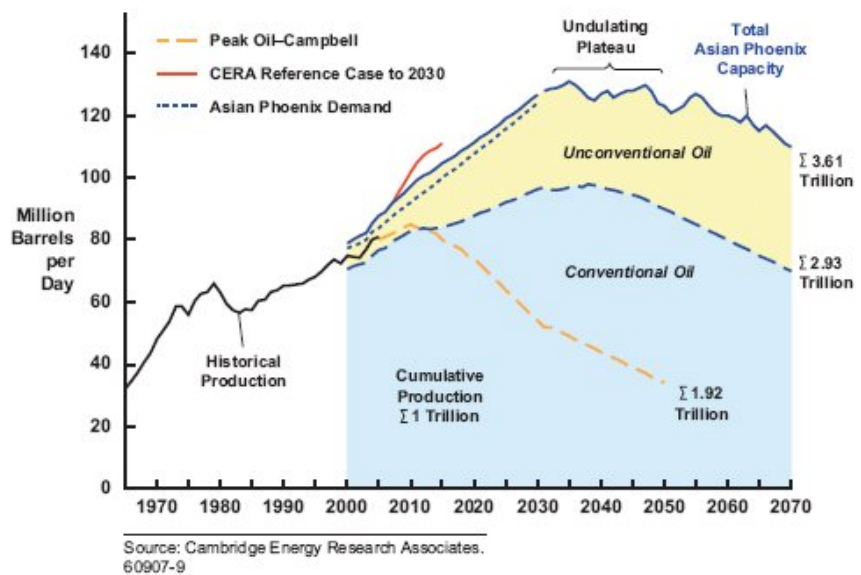
Posted by [nate hagens](#) on March 28, 2007 - 8:23am

If you're like me, you might have spent a moment or two in recent months pondering how billionaire oilman T. Boone Pickens, oil banker Matthew Simmons, and many others are suggesting that the world is reaching Peak Oil *now*, and at the same time, Cambridge Energy Research Associates (CERA) headed by Pulitzer Prize writer Daniel Yergin, and others such as Exxon Mobil, are not predicting a Peak in global oil production until circa 2040 followed by a slow gradual decline. How can such smart and successful people disagree by *decades* on a topic so *vital*?

Is it possible they use different data sources? Do they mean different things when they say "Peak Oil"? Do they get different secret handshakes from Saudi princes? Do they have different agendas? Are they using different boundaries of analysis? Is one of them kidding? This 3 part post will address how people can differ so much on something so important as a peak and subsequent decline in world oil availability, addressing both *factual* and *psychological* reasons. Does the world have plenty of oil? Maybe, but as I will discuss below the fold, this is not among the questions we should be asking.



Undulating Plateau versus Peak Oil



Part One is a general background and history on why people can disagree so much on peak oil.

Part Two will explore the many factual areas that are confusing and lead to different conclusions.

Part Three will look at social and psychological reasons for disparate opinions on this critical topic.

BIG PICTURE

Humans like to eat and have sex (1). We also are designed to compete with each other and other species for resources (2)(3). This function of population times demand will *continue to increase*, ceteris paribus.

We live on a planet subject to natural laws. The procurement and use of oil, a finite resource critical to our globally interconnected society, follows the 2nd law of thermodynamics. As we transform carbon from low entropy into human use plus waste, an increase in the 'heat loss' will occur as we find, pull out and transform the more difficult fossil deposits. Technology is thus in a battle with depletion, and so far depletion is winning. What once returned over 100:1 on an energy investment is now below 20:1. (4&5) The ease of finding, harvesting, refining and distributing liquid fuels to society, will *continue to decrease* over time, ceteris paribus. Yet we continue to rely on abstract (fiat) accounting methods to measure our real resource base - furthermore, the debt and credit that allow the world economic system to grow are increasing exponentially, while at the same time the real economic driver, cheap availability of high flow rate liquid fuels, is becoming more scarce.

Peak oil, as will be discussed below, has many definitions. Simply put, it is about one important intersection of the above two trends. It represents the general time frame when human demand for the energy services derived from oil will permanently diverge from our capacity to provide them. In effect, though the resources exist, we will not be able to afford the prices necessary to procure them for a global democracy.

Modern human culture, capitalism, globalization, food production, and essentially all aspects of life as we know it (unless *we* are Amish, 3rd world, or off-the-gridders), centers around oil, electricity and natural gas. Peak Strawberries or Peak Snapple obviously wouldn't be as big of deal.

Peak Oil is not a theory. It is a fact. Only the timing, magnitude, and implications are open to interpretation. How we interpret them should be a top priority for us individually and collectively. This post addresses why there are so many disparate opinions on this subject - many are concerned - many are unconcerned - many flip/flop from being concerned to unconcerned, etc. **Why?**

PRE-AMBLE

There exists considerable rancor between increasingly polarized groups on this topic. Many names for the two camps have been used: cornucopians/doomers, optimists/pessimists, pollyannas/cassandras, etc. I prefer to group them as the 'relatively unconcerned' and 'relatively concerned', as it is the level of concern that will motivate near term actions and policies. So far, the 'unconcerned' group (which includes the 'unaware') comprises the vast majority of the population.

I obviously am in the 'concerned' camp. For people interested in my motives, here they are: - I am getting my Ph.D. in Natural Resources specializing in the energy/human nature side of the Peak Oil problem. Like my fellow Oil Drum contributors, I offer my time freely because I believe this issue needs to be urgently addressed, especially at the regional, local and community levels, due to the long time lag between policy change and meaningful response. Neither the mainstream media nor the scientific community have connected enough dots to communicate the urgency with which this problem needs to be addressed. My writing here is an attempt to get people in macro-policy and decision-making positions to *think* in ways that exposure to typical media and stimuli-laden schedules may not elicit. If my efforts result in a slight course change of current misguided energy and environmental policy or help citizens or communities better prepare, the effort will have been worthwhile (and, if I should randomly receive an email from a single, attractive off-the-grid farmer, I would view that as a positive externality (female only pls...))

AND NOW, A WORD FROM THE UNCONCERNED

CERA and Exxon are probably the most vocal oil optimists (not all oil companies are inherently

- [Why the "Peak Oil" Theory Falls Down - Myths, Legends, and the Future of Oil Resources](#)
- [Peak Oil Theory Could Distort Energy Policy and Debate](#)
- [There is No Evidence of A Peak in the Next 10-15 Years](#)

Some of the main points of these pieces include:

- *Based on a detailed bottom-up approach, CERA sees no evidence of a peak before 2030. CERA believes that we will see an undulating plateau of global production starting sometime after 2030, which is likely to last for a number of decades. Towards the end of the plateau period, we envisage that global production will decline more gently compared to the very rapid production decline predicted by the peak oil lobby**.*
- *We hold that aboveground factors will play the major role in dictating the end of the age of oil.*
- *Despite his valuable contribution, M. King Hubbert's methodology falls down because it does not consider likely resource growth, application of new technology, basic commercial factors, or the impact of geopolitics on production. His approach does not work in all cases—including on the United States itself—and cannot reliably model a global production outlook. For example, production in 2005 in the contiguous 48 states in the United States was 66% higher than Hubbert projected.*
- *The peak oil theory causes confusion and can lead to inappropriate actions and turn attention away from the real issues. Corporations, governments, and other groups, including nongovernmental organizations, need to have a coherent description of how and when the undulating plateau will evolve so that rational policy and investment choices can be made. It is likely that the situation will unfold in slow motion and that there will be a number of decades to prepare for the start of the undulating plateau.*

**There is no such thing as a 'peak oil lobby'. A) we have no money and B) lobbying implies pursuit of special interests; educating society about Peak Oil is in the interest of the global commons.

A FEW WORDS ON WHY THE CORNUCOPIAN THEORY FALLS DOWN

Before I add my own thoughts to this debate, here are some recent rebuttals of CERAs claims, predictions and analysis:

- [Dialoguing with Dr Peter Jackson - Is the Future of Oil Resources Secure?](#)
- [The Forecasting Record of CERA and other Commentators](#)
- [Does the Peak Oil "Myth" Just Fall Down? - Our Response to CERA](#)
- [An Open Letter to Peter Jackson of CERA](#)
- [Its CERA Week and Houston We Have a Problem](#)
- [Peddling Petro-Prozak - CERA Ignores 10 Warning Signposts of Peak Oil](#)
- [Does TheOilDrum Threaten CERAs Market Share?](#)

Some of the main points of these posts include:

- *CERA conflates reserves with resources*
- *CERA conflates productive capacity with productive flows*
- *CERA misrepresents what King Hubbert modeled, and how subsequent modelers use linearization methods.*
- *Approximately 50 countries have **already** peaked, more are peaking or about to peak (China, Mexico)*

- *So far the discovery forecast that CERA uses from the USGS is 77% too optimistic (see [here](#))*
- *CERA's track record on individual countries is poor because its been too optimistic (see [here](#))*
- *CERA needs to publish production intervals (i.e. a lower bound + a higher bound) not just production capacity.*
- *The Hubbert high forecast was spot on for the lower-48 (1% error on the 2005 cumulative production after 40 years!)*
- *Unconventional sources are slow sources of oil (low flow rates)*
- *Energy profit powers civilization. It is unlikely we can afford the substitutes to cheap oil in a timely fashion, a fact which will likely accelerate oil decline rates.*
- *The Super-giant fields with high flow rates are dying (Ghawar, Cantarell, Burgan etc.)*
- *Reserve growth remains unproven at the world level and is based on observed reserve growth for the US (Attanasi et al.) which is likely biased due to the inclusion of censored statistics*
- *CERA fails to acknowledge (or realize) that the long list of 'above ground factors' exist precisely because of increased geologic constraints on 'below ground resources'*
- *The best technology in the world and higher prices did little to change the production profile of the United States, which peaked in production in 1970.*
- *Ultimately its not about how much oil we extract or what year this level peaks, but what contribution energy makes to society. Our institutions and policies are based on inexpensively substituting human labor with fossil labor. If we have plenty of fuel but it costs 3X as much, this substitution breaks down*

MAN ON THE STREET

As with my last article on [discount rates](#), I thought I'd include an interview with one of my friends, who happens to be an energy broker at a middle-tier Wall Street firm. His name is John (not really).

Nate: Yo Johnny - how's it going?

John: Not lousy Nate. I'm sure your environmental friends are dancing a jig on this TXU deal but they are going to be singing a different tune in 2009-2010.

Nate: Why is that?

John: They defeated the construction of new coal plants. Texas needs that energy man - there are going to be blackouts in a few years and not just sporadic ones. Someone else will have to build those coal plants.

Nate: I didn't know that - perhaps we can talk more about that another time. I'm writing another Oil Drum piece. Did you ever read my last one on how we steeply value the present over the future?

John: Um, I actually started it then got called away - It looked real good. But maybe you should put the summary points up top so busy people can get the special sauce without spending 20 minutes trying to read everything - you are kind of wordy you know.

Nate: Thanks for that. So what do you know about CERA - I am thinking about writing a piece criticizing their criticism of Peak Oil. Are they respected? Do your clients talk about their research?

John: They are respected. Probably upper 25%. Real mensa types.

Nate: How can they realistically disregard net liquids and flow rates and instead focus

John: Hey man - they are not policy wonks - they try and make money for their clients and thus themselves. CERA is a cash cow for IHS Energy. Their clients think the same way mine do - their long term strategy is to make short-term profits. So if they paint the oil picture a certain way thats advantageous to their clients, they make money. And it's all about money man. And what do you mean, net liquids?

Nate: Actually it's not all about money. But thats a different topic. Do your clients agree with the cornucopian rhetoric behind those recent peak oil denial reports from CERA?

John: Cornucopian rhetoric? Man have you turned into a philosopher or something? Like I said, my clients are looking at how to make money in the oil markets over the next 6 months. They realize Peak Oil probably is for real but still view it from an investment perspective, not a life perspective. My smartest clients think that CERA is using 2007 geology with 1970 cost structures and 2050 technology in their projections - but the story still sells. CERA has smart people but they're definitely drinking the kool-aid.

Nate: Do your clients understand net energy? That producing energy requires energy and this comes out of a shrinking pool as the quality resource depletes?

John: I think less than 5% of the street thinks of things that way, and most of those are the analysts. The ethanol debate started people thinking about net energy but most everyone still thinks in dollar terms.

Nate: But don't they realize that oil is finite and dollars are not, meaning this increase in oil prices is going to accelerate once we permanently cross peak in net oil available for purchase?

John: There is the beginning of such conversations. Obviously with \$60 oil, the E&P sector should be printing money, but alot of companies' costs are going up more than their revenues. New finds of oil are really expensive, especially domestically. Chevron, with all the hoopla a few months back, has still not sanctioned Jack II. I'm guessing it's cost related.

Nate: But do you thi---(phone rings)

John: Nate buddy. I gotta hop. This is one of those clients whose long-term strategy is short-term profits. Later.

Nate: Bye



REASON #1 - THE PHRASE "PEAK OIL" MEANS DIFFERENT THINGS TO DIFFERENT PEOPLE

When someone says 'oil has already peaked' or 'peak isn't until 2020', what do they mean? Peak Oil can (and will) have many definitions. It would benefit policy debates and discussions if there were a universal, agreed-upon definition. The most common is the year in which global crude oil production reaches its maximum sustained level, followed by a permanent decline. Some (Ken Deffeyes) define Peak as the date when 50% of the world's oil has been used irrespective of the annual flow rate (presumably, we could have used 50%+ of our oil and still have rising production if technology is allowing us to borrow from what would have been a bell shaped curve.)

Other definitions differ in [what is included as 'oil'](#). The most restrictive includes only oil graded as "Light Sweet". More common definitions include condensate and Natural Gas Plant Liquids (NGPL). Still broader definitions include the heavy oils, the Orinoco oil sands, and the Alberta tar sands. And the broadest measure of 'what is oil' might include corn and sugarcane turned to ethanol, palm nuts turned to biodiesel, and coal turned to diesel fuel. This is referred to as "All liquids" and is what is commonly reported as total oil production in the media.

Ultimately, we want oil for the energy services it provides. None of us should care about how much daily or annual gross oil production of this and that there is, other than these statistics being precursors to a more important statistic: ***the cost of net liquids available to the non-energy, non-governmental sectors of society***. This is the oil that is able to 'do work' for the world economy. As I will discuss in Part Two, gross statistics are misleading on three counts: 1) NGPL and ethanol have lower BTU content than crude oil yet are counted the same 2) procuring energy requires energy - a low energy requirement product is counted the same as a high energy input product and 3) following best first principles, depletion eventually overtakes technology, until one day an energy break-even point is reached in the extraction of a resource, irrespective of price. Total costs (since it is difficult to parse all inputs into energy), will reach break-even well before energy break-even. Thus future projections that assume oil in 2040 has the same ability to do work for society, after its energy costs have been subtracted will prove to be wildly optimistic. But once peak production is passed, the decades away peak camp will rationalize it as something other than geology - (more on our psychological reactions to Peak Oil in Part III...)

References:

1. Malthus, Thomas, "An Essay on the Principle of Population" 1798
2. Williams, George "Adapatation and Natural Selection" 1968

3. Lotka, Alfred J. "[Contribution to the Energetics of Evolution](#)" 1922
4. Cleveland, CJ, "Energy Quality and Energy Surplus from the Extraction of Fossil Fuels in the US" Ecological Economics 1992:6 139-162
5. Cleveland, CJ, "[Net Energy from the Extraction of Oil and Gas in the United States](#)"(pdf)

Coming up next

[PEAK OIL - WHY SMART FOLKS DISAGREE](#)

and

[SOCIAL AND PSYCHOLOGICAL REASONS WHY PEOPLE DISAGREE ON PEAK OIL](#)



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