



## It's CERA Week -- Houston, we have a problem

Posted by [Dave Cohen](#) on February 16, 2007 - 1:15pm

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It is [CERA Week](#) and, consequently, there is a steady stream of nonsense emanating from Houston. In this brief note, I will talk a bit more about what the concept [Peak Oil](#) is.

My remarks are in reaction to [Running out of oil may not be the issue at all](#) by Kristen Hays, reporting in the Houston Chronicle on February 14th on statements by John Watson, head of international exploration and production for Chevron, at the CERA conference.

All the talk of when the world will run out of oil could be rendered irrelevant because of geopolitical issues that block access to untapped reserves, the head of international exploration and production for Chevron Corp. said Wednesday.

Here are some of the details as reported in the Houston Chronicle.

John Watson told energy executives and analysts that the so-called peak oil debate focuses on the level of resources below the ground. He joined the prevailing view of speakers at the Cambridge Energy Research Associates' annual conference in Houston that the planet won't run out of oil anytime soon despite opposing theories that a peak and subsequent drop-off in production is imminent or even ongoing.

"Every time we say we're about to be tapped out, we find new ways to squeeze more out of reservoirs," he said.

Or, companies find new wells in hard-to-reach places, like Chevron's huge [ultra] deep-water Jack discovery last year about 270 miles southwest of New Orleans in the Gulf of Mexico.

But worldwide oil production could still lag behind demand if politics get in the way of access, Watson said....

"Above-ground peak oil will trump below-ground peak oil every time," Watson said.

Let's examine this point of view.

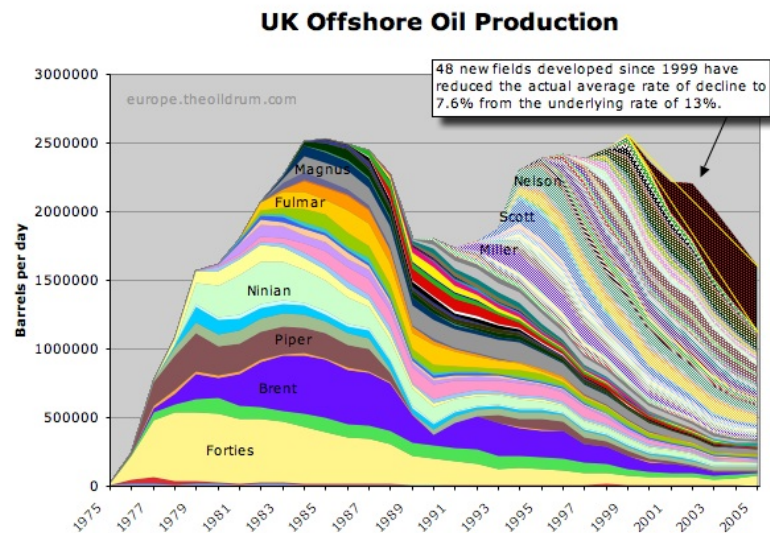
Despite much searching on my part, it is hard to find good evidence that the global recovery factor (URR/OIP) has increased much. But, assuming a higher recovery factor, and regarding "squeezing more [oil] out of reservoirs", Watson's statement says nothing about the rate at which this putative extra recoverable oil is lifted out the ground. Framing this mathematically, no

statement has been made about  $dQ/dt$ , where  $Q$  is the cumulative production and  $t$  is time. If you can "squeeze out" more oil, but you can only do so at a very small rate measured in barrels per day, then the recovery factor over a very long time period (measured in decades) is irrelevant to the issue of "peak oil". Concomitantly, if you apply enhanced oil recovery (EOR, eg. gas injection) or improved oil recovery (IOR, eg. horizontal drilling) — techniques meant to maintain previously achieved production rates or boost production after it has peaked in a field or basin — then it is important to remember that such techniques have a *limited warranty* attached to them. In other words, they are guaranteed to work for a relatively short period of time, measured in some small number of years. Witness what is happening at Cantarell after the use of Nitrogen injection.

However, even if one grants a higher recovery factor, it still seems to be the case that most increased world production [since the year 1996](#) —to pick a date— has come from either 1) new fields discovered sometime in the last 20 years or 2) additions to fields discovered further back in time — this is called *reserves growth*. Remember, world oil discoveries peaked in the 1960's. In the first case, older basins like the Caspian have been re-explored, which has led to new fields like the [Azeri-Chirag-Gunashli](#). In other cases, technology has enabled development of deepwater fields like [Dalia](#) (offshore Angola). Given the historical discoveries curve, there appears to be a limited horizon under which such production can replace, let alone surpass, current declines in existing production, which most estimates place at 4 to 5% per year.

## Deepwater and Some OGJ Data

While ultra-deepwater holds some promise, it is still the case that all deepwater fields ramp up quickly, peak and then fall off rapidly, and the shape of this curve further depends on the field size. Look at this graphic compiled by my European colleague Euan Mearns in [The architecture of UK offshore oil production in relation to future production models](#).



*UK Offshore Production — new field additions  
have reduced the overall decline rate from 13% to 7.6%*  
[Click to enlarge](#)

As usual, the larger fields were produced first. After an interruption — which I shall discuss below — a large number of smaller fields were put on stream. All these offshore fields show the same production profile, but the smaller fields produce less oil, just as they peak and decline more quickly. You can expect to see this historical trend in the future in the other prolific deepwater basins — the Gulf of Mexico, Brazil (Campos & Santos basins) and West Africa (Gulf of Guinea,

Nigeria, Angola). Therefore, future ultra-deepwater fields will likely provide only replacement barrels for declining deepwater production *at best*, hype about [Jack #2](#) aside. In any case, new fields will have to be constantly found and completed to maintain production rates. This trend is obviously unsustainable.

As for this —

CERA released a report last November that took aim at theories that the world has hit or passed the peak of oil production. CERA argues that information from the U.S. Geological Survey shows the world has 3.7 trillion barrels of oil, both tapped and untapped, rather than the 1.7 trillion barrels estimated by some peak-oil theorists.

CERA's outlook includes conventional oil, or that extracted from the ground or in shallow waters offshore, as well as unconventional oil, or that derived from oil-soaked sands, natural gas liquids and coal turned to liquid and shale.

— it is sufficient to note that discoveries [have not kept pace](#) with USGS predictions and that oil from shale, various sands (including [Canada](#)) and coal-to-liquids conversions will not make major contributions in any time frame we care about.

**Some recent data:** according to the *Oil & Gas Journal* (February 5th), the world's natural gas liquids supply in 2006 (10 month average) was up over 2005 (same period) by 83.0 kbd, a rise of 1.04%. Outside the Middle East, the world was *down* 34.0 kbd. According to the *OGJ* (February 12th), the world oil (crude + condensate) supply in 2006 (11 month average) was up 479 kbd, a rise of 0.66%. If it weren't for the former Soviet Union (FSU), the world would have been substantially down. These numbers amount to *no significant change*, given margins of error in the data. The data indicate failure, an inability to grow the world oil supply. Is this being discussed at CERA Week in Houston?



*Lovell: Houston, we've had a problem.  
We've had a main B bus undervolt.  
The Oil Drum team studies the glitch.*

[Source.](#)

## Stochastic Factors

Now, as you can see, the UK offshore production shows a "double hump" in the historical profile. Why? The short answer is that *shit happens*. The longer answer was provided to me by Euan.

The first peak is built on the back of giant fields — Forties, Brent, Piper and Ninian. The oil price crash of 1986 led to a slowing in investment, the postponement of several new field developments and a hiatus in exploration, which in turn led to a bi-modal discovery history.

The Piper Alpha oil rig explosion of 1988 that led to lost production from this hub for 4 years, and reduced production from a number of fields while sub-sea control valves were fitted to production wells in the wake of this disaster.

The rise from the valley between the peaks was caused by postponed projects being reinstated, large new fields being developed — Nelson Miller, Scott — and the end of forced maintenance retrofitting safety valves.

So, considering what happened in the North Sea, and getting back to Watson's remarks, the important thing to understand is that there is a *stochastic* component to oil production. In the modern geopolitical world, it just *happens to be the case* that most of the world's remaining reserves are currently in unfriendly or dangerous places. The geographical distribution of the world's largest oil-bearing basins is an artifact of events (for example, plate tectonics) that occurred in geological time, as well as the inherent randomness in human history that drew those country boundaries and the populations that live within them. That's just the way it is. This observation must be qualified by a more recent historical fact — the West has already used up most of its easy oil. See the last section.

Watson said other above-ground risks include gaining access when national oil companies control about 80 percent of reserves.

Watson can complain all day long that Hugo Chavez has a bad attitude or that Kuwait is lazy, but the simple fact remains that concerns about peak oil are not limited to geological constraints, which themselves were subject to the vagaries of deep time. Our concerns also encompass random, non-deterministic "above-ground" elements. Ask Vladimir Putin what it means to *get lucky*. Actually, perhaps it would better to ask the EU or the Ukraine. We also need to acknowledge the injurious effects of random geopolitical events — the Iraqi civil war, Iranian leadership & policies, western leadership (W) and policies toward Iran, Venezuelan politics, Nigerian rebels — and then move on. If Al-Qaeda hadn't bombed the World Trade Center, we wouldn't have invaded Iraq, which wouldn't be falling apart.... There is always this stochastic element in human history, just as human nature never changes. It is a form of unreality for Watson & others to bemoan the lack of a perfect world for oil production where there are no wars, national politics, catastrophic equipment failures, economic recessions, price volatility, conflicts between social groups, etc. Get used to it.

The oil price provides special cause for concern as another stochastic "above-ground" factor. There is apparently no guarantee that the oil price will provide a reliable signal of supply & demand fundamentals over short time periods (up to several months, perhaps longer). All sorts of irrational market "perceptions" and random events influence the oil price. Unless there are guarantees that the price will remain high, the oil companies will not even bother to produce ultra-deepwater fields or other difficult-to-produce resources. Even price depressions lasting short periods of time can do lasting damage to the world oil supply — this is the destructive effect of volatility.

Really, what Watson should be addressing is why the oil industry is such a mess. Inflation is

eating up new E&P investment, there are equipment and skilled labor shortages. The infrastructure supporting existing production is aging and not being maintained (see Prudhoe Bay or use of rigs that should have been retired).

## Keeping Our Eye on the Ball

Returning again to geology, we get this statement —

Joseph Bryant, CEO of Houston-based exploration and production company Cobalt International Energy, said at Wednesday's peak oil panel that the industry continues to develop new resources — just not "super giant" fields.

Bryant said that until technology shows there is nothing new to find, it's difficult to conclude that the planet is running out of oil.

"I do not think there's an endless supply of super-giant fields," he said, but they may not be needed if producers tackle more fields more efficiently.

It's good to know Bryant finds it difficult to conclude that the world is running out of oil. We've reached the same conclusion at The Oil Drum. It's also heartening that Bryant does not think there is an endless supply of super-giant fields, because this indicates some connection with reality. And, if we define "super-giant" as being in the same size range as Burgan, Ghawar, Samotlor, Daqing or Cantarell, then we can most likely conclude that there are *no fields of this type* left on Earth. We know that "super-giant" is not as big as it used to be. As to the idea that we *may* no longer need such fields if we "tackle more fields more efficiently", I am not comforted by the conjecture that *an envisioned increase in the global recovery factor in many smaller fields will provide enough oil in a timely manner, and do so indefinitely until unknown substitutes come onstream*, thus rendering the peak & subsequent decline of world oil production a non-event.

Another thing not spoken, which is little understood by the public, is that we already ran through most of our oil here in the West, and what a shame it is that those uncooperative people in the rest of the world won't play by our rules — and give us what we want. This dilemma is compounded by the fact that some uppity countries in Asia are being quite assertive of their rights to a significant share of what oil remains. This "argument", if you can dignify it with that term, presumes that it is only a matter of allowing the international oil companies to produce huge untapped resources in the large producing countries. Blame is assigned — the exporting nations are culpable for withholding their oil, either from greed, hostility or incompetence. Thus, the presuppositions — that 1) there are vast, untapped resources ripe for the picking and 2) these riches could be easily brought on stream in a timely way to satisfy ever-growing world demand — are not questioned.

Until Chevron's Watson or Cobalt's Bryant or organizations like CERA start dealing with reality — and leveling with the public — instead of engaging in wishful thinking or complaining about things they have no control over, we will have to listen endlessly to this empty discourse while doing nothing to mitigate the effects on world economies of a peak & decline of available oil supply, regardless of its causes. Let's keep our eye on the ball.

*Dave Cohen*  
*Senior Contributor*

*The Oil Drum*

*davec @ linkvoyager.com*



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