



## Critiquing the 2006 Megaprojects report

Posted by [Stuart Staniford](#) on April 6, 2006 - 8:31am

Topic: [Supply/Production](#)

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The ASPO-USA folks requested me to offer my opinions on Chris Skrebowski *et al's* [2006 megaproject report](#), and I had an interesting email debate with them today. Here are my thoughts on it, now that I've had a (middle of the night) chance to study it.

The executive summary is that while I think this report

- was a good deal of work and is a considerable service to the public
- has some improvements from prior "bottom-up" reports

nonetheless, to no-one's surprise perhaps,

- I don't think this methodology is reliable at this time.
- I disagree with the conclusions of the report.

You can find [the report here](#) (kindly hosted by the folks at [Sydney Peak Oil](#)). Let me start by trying to summarize what it says, and how it differs from last year's report.

The basic conclusion of the report is that, as long as there are no major shocks/disruptions, total oil supply will continue to increase at a modest 1mbpd-2mbpd rate per year through 2010. The report does not analyze beyond 2010. Thus it proposes that the peak of oil supply is later than 2010. However, since 1-2mbpd increases are not likely to sate a fast growing world economy, the report suggests that prices will continue to be high throughout that period.

This picture is markedly more optimistic than [last October's report](#), which suggested that essentially all spare capacity had been used up in 2004, and it seemed unlikely that enough new capacity could be added to make up for an assumed 5% decline in existing production. Therefore peak oil was presumably real soon.

The causes of the greater optimism are twofold. One is an increase in announced projects (especially in OPEC, Canadian tar sands, and the inclusion of smaller projects down to a 50kbpd peak flow cutoff). The other is a change in the way that depletion is computed, which is effectively quite a bit more optimistic.

The new estimates are summarized as follows (this taken directly from the report).

	2005	2006	2007	2008	2009	2010
Opec new capacity	1,160	1,520*	1,420*	1,320*	2,240*	2,235*
Non-Opec capacity	1,416	1,865*	2,320*	1,886*	1,710*	1,035*

Total new capacity	2,576	3,385*	3,740*	3,206*	3,950*	3,270*
Capacity erosion	1,226	1,400	1,600	1,750	1,800	1,850
Net new capacity	1,350	1,985	2,140	1,456	2,150	1,420
Gulf of Mexico loss	300					
Net Net	1,050	1,037**	1,300**	1,866**	1,622**	1,189**

All figures are in thousands of barrels per day (or millions for Europeans treating the comma as a decimal). Let us take the lines in turn.

The first three lines concern new capacity based on a tabulated list of projects (assume to occur without delays - that is the meaning of the \*). I have two minor concerns here, but basically I am willing to accept that these values are reasonable - the process of tabulating these lists in the various reports has been improving steadily in the last few years as the different players improve their lists and compare notes with each other's efforts. My minor concerns are that the 2010 numbers are probably not very reliable since further 2010 projects could easily be announced this year, and perhaps even into next year a little. Secondly, the way that new capacity is allocated between years is not clearly described. This issue arises because a project that reaches first oil in one year probably doesn't reach it's plateau until some months or a year later, and may not have it's first full year of plateau production until two years after first oil. There is a little text in the report suggesting there is some accounting for this, but it's not possible to assess the details. Still, I do not think either of these caveats are likely to be conclusion changing.

The next line (capacity erosion) is where depletion is accounted for, and therein my critique will lie. However, let us come back to it in a moment. The "Net new capacity" line is the new capacity with the "capacity erosion" subtracted out. The line after that is a one-time loss to account for 2005 hurricane impacts on production. Finally, the "Net Net" line also adds in some fudge factor for Murphy to enter the picture and delay projects and cause them to fail to meet their hoped for production targets. So that last line is really the bottom line, and as you see, it is positive in every year: Chris expects capacity, and one assumes production, to increase each year through 2010.

The Achilles heel of this whole methodology, in my opinion, is that we have a very poor handle on the decline part of it. The typical bottom-up analysis in the past has, after completing a long, careful book-keeping exercise on the new projects, devoted about two sentences of handwaving to justifying a fixed percentage for the decline rate. However, the conclusions are invariably very sensitive to the decline rate. And this uncertainty renders the whole analysis moot. Although this latest report has a different approach, I do not believe it is reliable either, and thus this report does not move us any closer to a solution. I am not personally very persuaded that there is going to be a solution, but I'd be glad to be proven wrong.

Let me quote in full the justification in the report text for the "capacity erosion" row in the table above. This paragraph pertains to how the 2005 capacity erosion was computed:

The projects that actually come onstream in 2005 had a notional capacity of around 2.6mn b/d. [Capacity additions are allocated by year and time of start-up – so this total includes increments from fields that started up in earlier years, and the amount of new capacity added in 2005 adjusted for start-up date.] However, the actual increase in 2005 supply was just 1.05mn b/d (according to IEA's Oil Market Report, February 2006). The explanation is the loss of capacity through depletion and the loss of capacity caused by the Gulf of Mexico hurricanes.

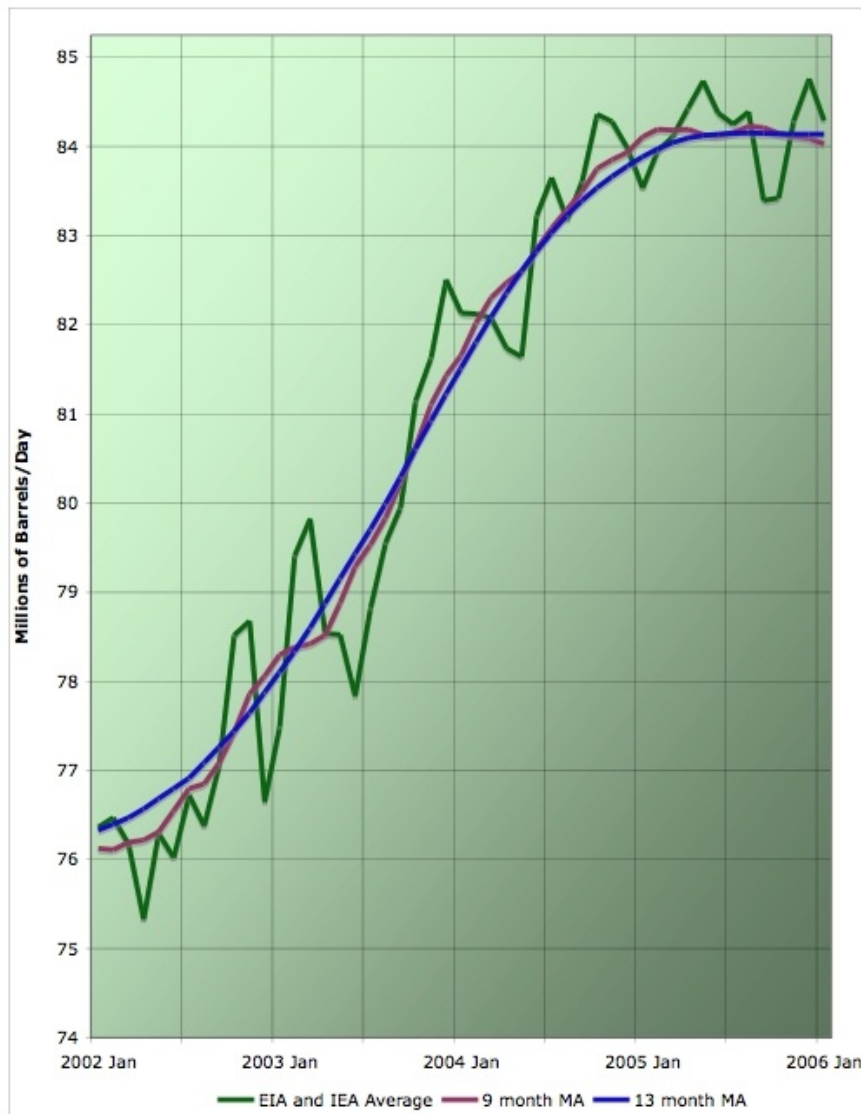
Capacity erosion or depletion will increase as more countries reach the point where their production declines year-on-year. Over the next few years China, Mexico, Malaysia, India and Brunei will move into decline. All the evidence shows that depletion tends to speed up rather than slow down – the North Sea being a good example.

That's it. That's all the substantive discussion there is on this row.

From my standpoint, there are major problems with both of these discussions. To take the 2005 situation first. Obviously, the capacity erosion number is a sum of several terms. It represents the depletion in existing wells, less workovers and additional drilling in existing fields, less new fields with production less than 50kbpd. I don't object to lumping these together: at least for now we have little choice.

However, the way this is done is problematic. I cannot find the IEA February Oil Market Report figure of 1.05mbpd increase in 2005 - the nearest thing I can find in there is a statement in the oil supply summary that January 2006 was up 1.25mbpd over January 2005. This appears to be approximately true, but meaningless: month to month fluctuations in supply are easily that large. It is also true that 2005 production on an annual basis was an increase over 2004 by about 1.2mbpd to 1.4mbpd, depending on which agency you like. So Chris says that there's a 1.05mbpd net net increase, subtracts out a 300mbpd one time charge for the hurricanes, and says that the difference between that and the 2.6mbpd of capacity additions is the capacity erosion of 1.226mbpd (four significant figures, no less).

Ok, but the real story of 2005 is that production plateaued! The "net net" increase was indistinguishable from zero! I know most of you must be sick to death of tracking these graphs twice a month, but I really do need to repeat it to make my point:



*Average daily oil production, by month, EIA and IEA (corrected) estimate averaged. Also a nine month centered moving average of the monthly series. Click to enlarge. Believed to be all liquids. Graph is not zero-scaled. Source: [IEA](#), and [EIA](#).*

So you can see why Jan 2006 is up sharply over Jan 2005 - Jan 2005 happened to be a big spike down. But that isn't representative. You can also see why 2005 as a whole year is higher than 2004 - in early 2004, production was still increasing. But that has stopped. Across 2005, if we average out the noise, production was pretty much flat. So I think there is no sound basis for this 1.05mbpd of "net net" increase. (And no, the plateau is [not due to hurricanes and wars](#).)

I also think there is no basis for putting in a one time charge of 300kbpd just in 2005. Firstly, there will be a smaller but non-trivial charge just in the GoM from permanent hurricane damage. Secondly, we are down 600kbpd in Nigeria for an unknown period, with the rebels threatening to make it worse. Thirdly, Iraqi production fell significantly in late 2005 and prospects for recovery are uncertain at best. So we are well on the way to at least as big a one time charge in 2006 even before hurricane season starts. And in an uncertain world, I see no reason to think 2007 to 2010 are likely to be any better.

So my position is that what happened in 2005 is that 2.6mbpd of new capacity was entirely offset by capacity erosion.

So, like Chris, I tend to assume that capacity erosion will increase in the future. By how much? On a year to year basis, I think there's basically no way to tell. In the grand scheme of things, over decade long timescales, I expect net declines to only increase to a few percent annually (absent major shocks), but year to year changes are likely to be noisy. Chris puts in some numbers without saying how he got them.

In the next year or two, Chris shows the gross capacity increases being a little higher than 2005 - 3.4mbpd in 2006 and 3.7mbpd in 2007. But that's before delays and disappointments. So we maybe get about  $0.5\text{mbpd} \pm 0.5\text{mbpd}$  of new capacity more than we got in 2005 (error bars subjective estimates of mine). Against that, we on balance are likely to get a highly uncertain amount of increased capacity erosion, and a highly uncertain amount of hurricanes, rebellions, and wars. Does that mean 2006 and 2007 will be better than 2005? Doesn't seem clear to me.

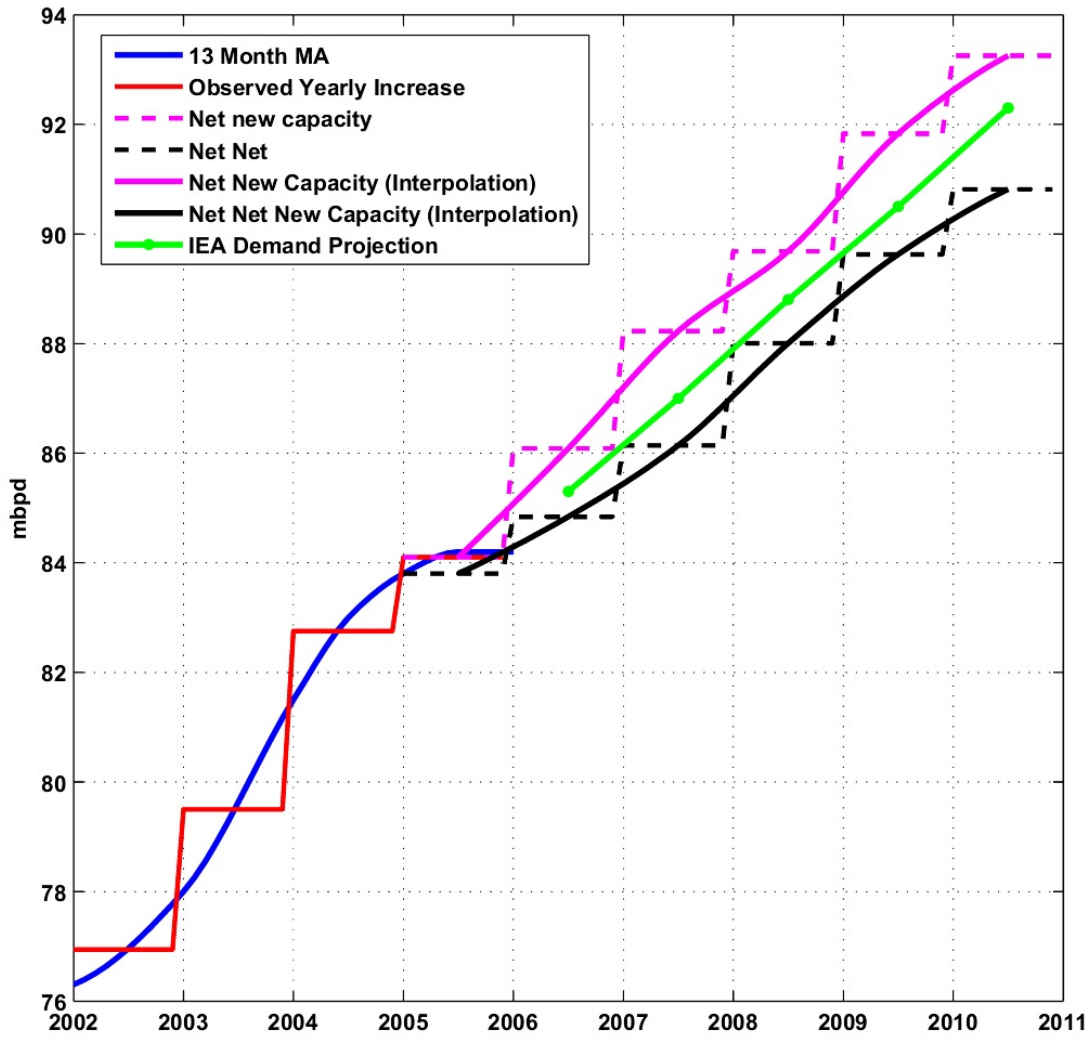
My basic view is that we are in a bumpy plateau until we hit a big oil shock because one of the various simmering problems around the global oil supply system boils over and sharply cuts supply for a while. Or in the alternative, we are in a bumpy plateau until the housing-bubble/crazy-hedge-fund-credit-derivative/global-trade-imbalance situation blows up and cuts demand for a while (eg [see Mish for a primer](#)). My wild-ass-guess probability of one of those things happening is about 0.2-0.4 per year. Which means we won't have to wait too many years.

And once one of those things happens, people will start really serious efforts to conserve which will cut demand for a decade or so, during which we'll consume another few hundred gigabarrels towards the URR, and after doing that, production will not be able to reach these levels again (which is good - we have some big ice caps to save).

At least that's my best guess and now I'm going to bed.

**Update [2006-4-6 15:31:21 by Stuart Staniford]:**

Khebab made a nice graph summarizing Chris's projections tacked onto the data in my graph above, together with the IEA's demand projections.



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