The Oil Drum
DISCUSSIONS ABOUT ENERGY AND OUR FUTURE

Peak Oil Update - November 2006: Production Forecasts and EIA Oil Production Numbers

Posted by Sam Foucher on November 20, 2006 - 10:55am
Topic: Supply/Production
Tags: ali morteza samsam bakhtiari, bp, chris skrebowski, eia, logistic, loglets, m. king hubbert, oil, oil prices, peak oil, rembrandt koppelaar, stuart staniford, update [list all tags]

Note, if you are coming in from Wikipedia, the latest updates can be found at this link.

An update on the last production numbers from the EIA along with different oil production forecasts.

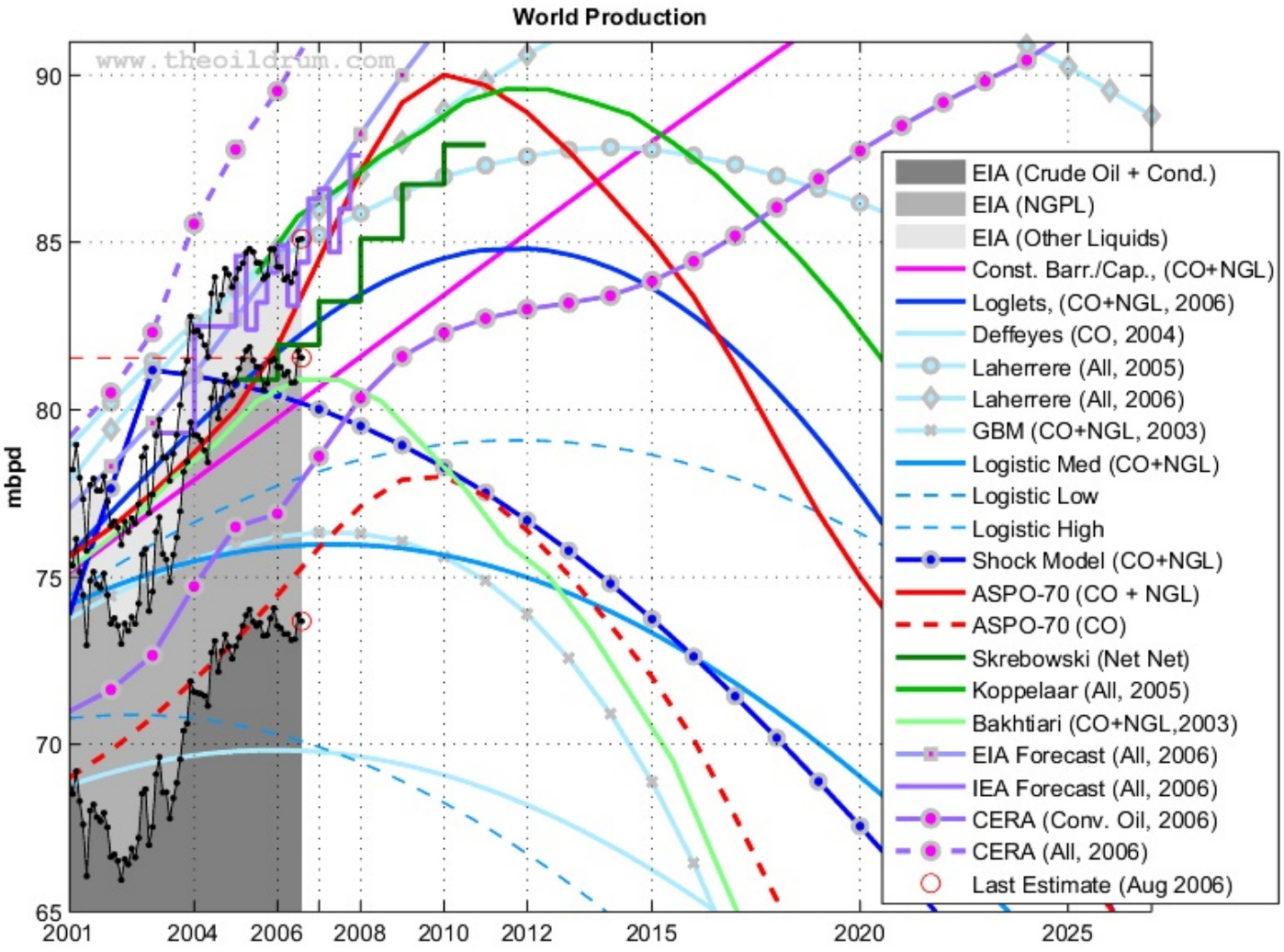

Fig 1.- World oil production (EIA Monthly) and various forecasts (2000-2020). Click to Enlarge.

New forecasts added:

- The shock model (Crude oil + NGL, 2004)
- The GBM model (Crude oil + NGL, 2006)
- Deffeyes (Crude oil + condensate, 2004)
- Jean Lahèrrere (All liquids, 2006)
- Forecasts from CERA (All liquids, 2006)

EIA Last Update (August)

Data sources for the production numbers:

- Production data from BP Statistical Review of World Energy 2006 (Crude oil + NGL).
- EIA data (monthly and annual productions up to July 2006) for crude oil and lease condensate (noted CO) on which I added the NGPL production (noted CO+NGL).

The All liquids peak is now August 2006 at 85.10 mbpd, the year to date average values (8 months) are down from 2005 for all the categories. The peak dates are unchanged for Crude Oil + Cond., NGPL and Crude Oil + NGL.

Category	Aug 2006	Aug 2005	12 MA[1]	2006 (8 Months)	2005 (8 Months)	Share	Peak Date	Peak Value
All Liquids	85.10	83.90	84.32	84.30	84.37	100.00%	2006-08	85.10
Crude Oil + NGL	81.55	80.60	81.16	81.20	81.25	95.83%	2005-05	81.87
Other Liquids	3.55	3.30	3.16	3.10	3.11	4.17%	2006-08	3.55
NGPL	7.88	7.36	7.69	7.78	7.76	9.26%	2005-02	8.04
Crude Oil + Condensate	73.67	73.24	73.47	73.42	73.50	86.58%	2005-12	74.06

Table I - Production estimate (in millions of barrels per day (mbpd)) for August 2006 taken from the EIA website (International Petroleum Monthly). [1]Moving Average on the last 12 months.

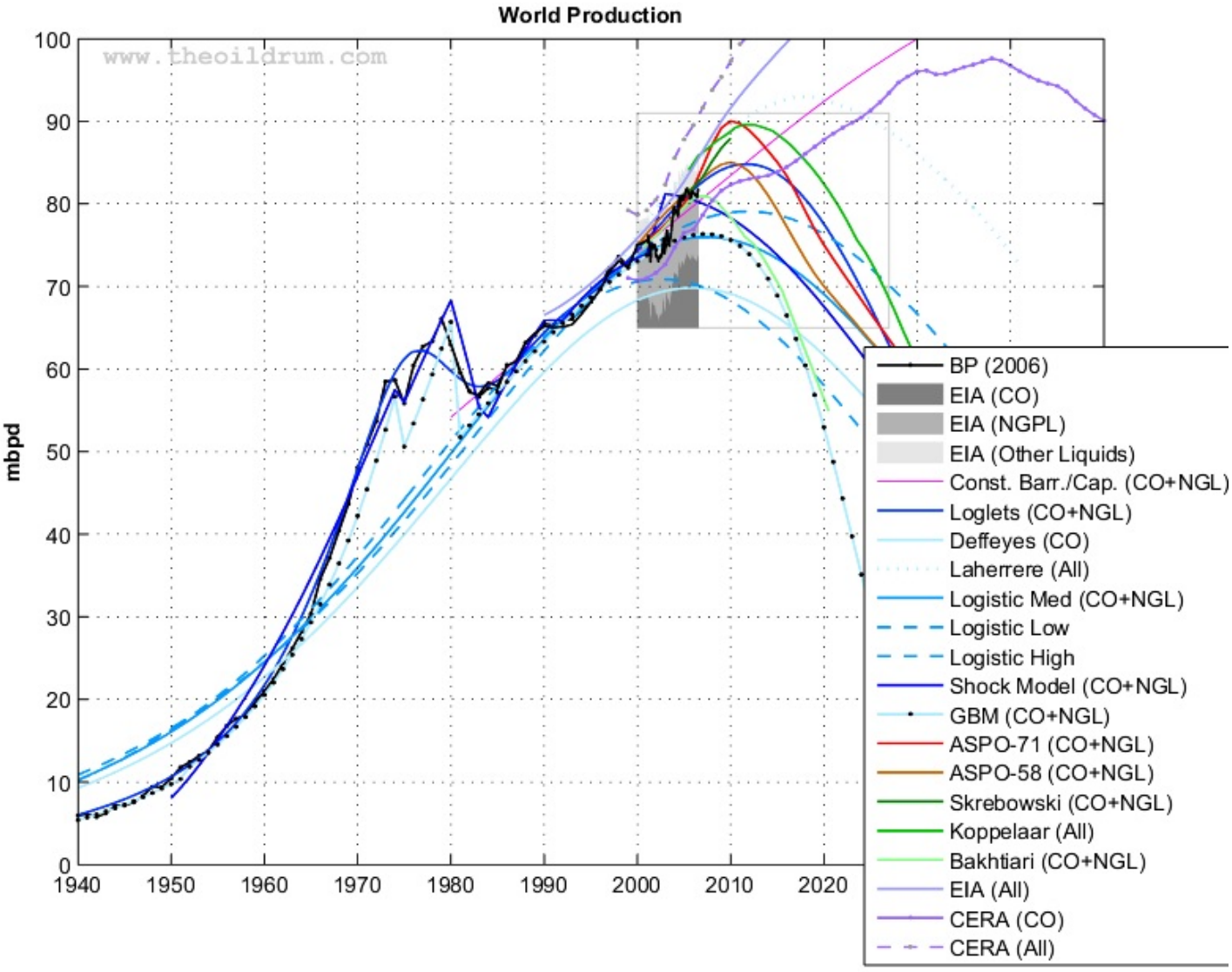

Fig 2.- World oil production (Crude oil + NGL) and various forecasts (1940-2050). The light gray box gives the particular area where the Figures below are zooming in. Click to Enlarge.

Business as Usual

- EIA's International Energy Outlook 2006, reference case (Table E4).
- IEA total liquid demand forecast for 2006 and 2007 (Table1.xls).
- A simple demographic model based on the observation that the oil produced per capita has been roughly constant for the last 26 years around 4.4496 barrels/capita/year (Crude Oil + NGL). The world population forecast employed is the UN 2004 Revision Population Database (medium variant).
- CERA forecasts for conventional oil (Crude Oil + Condensate?) and all liquids, believed to be productive capacities (i.e. actual production + spare capacity). The numbers have been derived from Figure 1 in Dave's response to CERA.

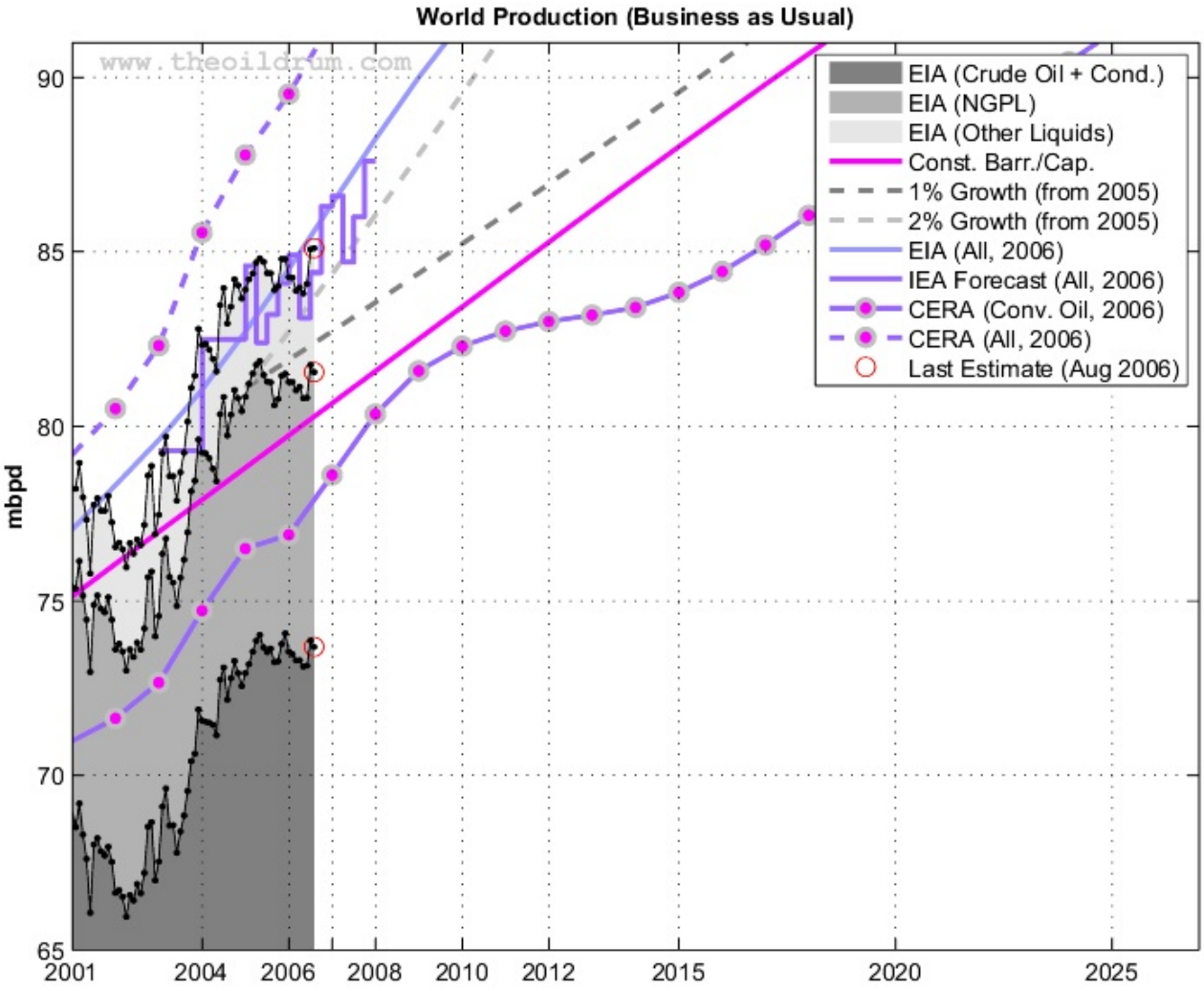

Fig 3.- Production forecasts assuming no visible peak. Click to Enlarge.

PeakOilers: Bottom-Up Analysis

- Chris Skrebowski's megaprojects database (see discussion here).
- The ASPO forecast from the last newsletter (#71): I took the production numbers for 2000, 2005, 2010, 2015 and 2050 and then interpolated the data (spline) for the missing years. I added the previous forecast issued one year and two years ago (newsletter #58 and #46 repectively). There was no revision since August 2006.
- Rembrandt H. E. M. Koppelaar (Oil Supply Analysis 2006 - 2007): *"Between 2006 and 2010 nearly 25 mbpd of new production is expected to come on-stream leading to a production (all liquids) level of 93-94 mbpd (91 mbpd for CO+NGL) in 2010 with the incorporation of a decline rate of 4% over present day production".*
- Koppelaar Oil Production Outlook 2005-2040 - Foundation Peak Oil Netherlands (November 2005 Edition).
- The WOCAP model from Samsam Bakhtiari (2003). The forecast is for crude oil plus NGL.

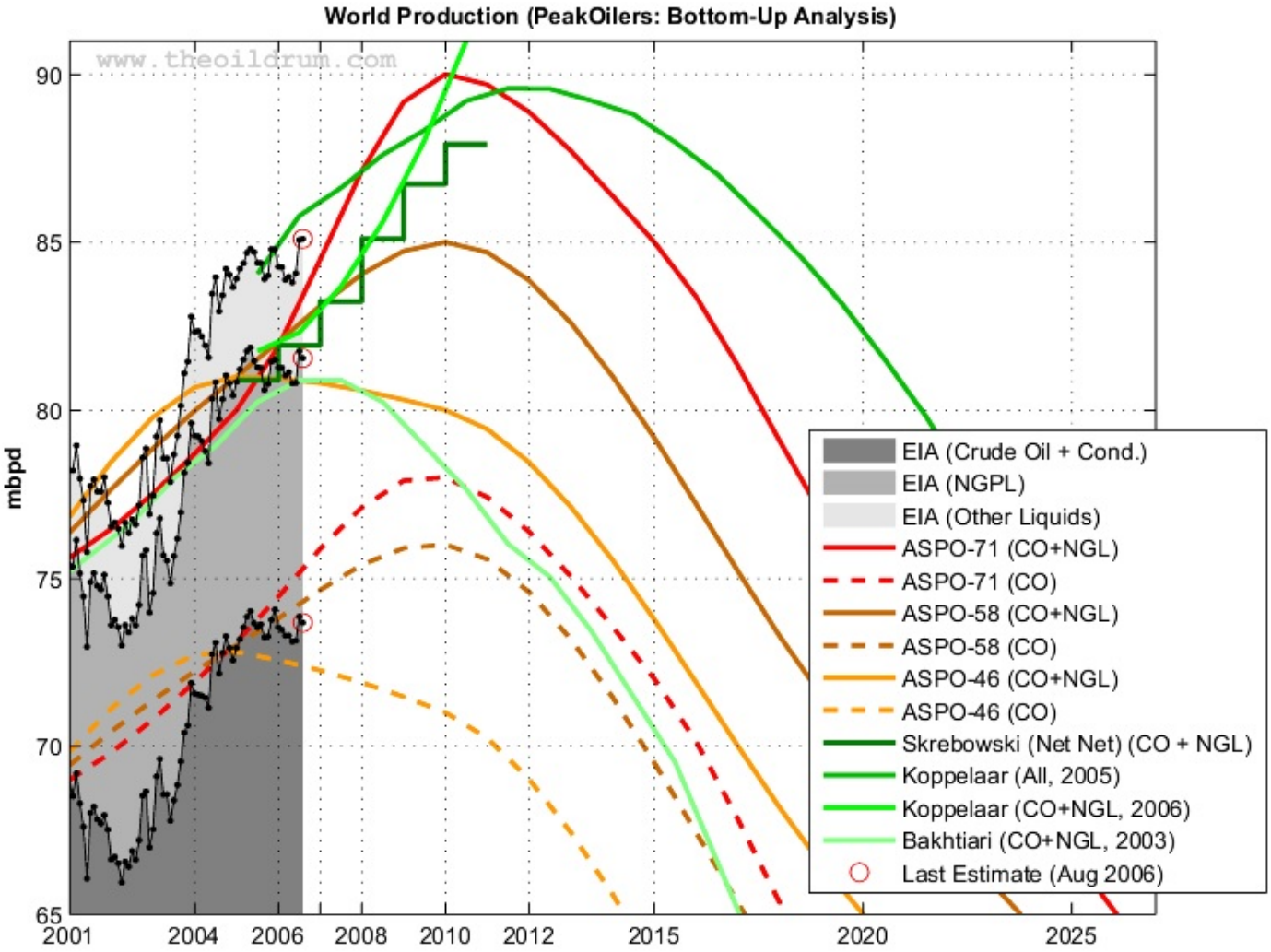

Fig 4.- Forecasts by PeakOilers based on bottom-up methodologies. Click to Enlarge.

PeakOilers: Curve Fitting

The following results are based on a linear or non-linear fit of a parametric curve (most often a Logistic curve) directly on the observed production profile:

- Professor Kenneth S. Deffeyes forecast (Beyond Oil: The View From Hubbert's Peak): Logistic curve fit applied on crude oil only (plus condensate) with URR= 2013 Gb and peak date around November 24th, 2005.
- Jean Lahèrrere (2005): Peak oil and other peaks, presentation to the CERN meeting, 2005.
- Jean Lahèrrere (2006): When will oil production decline significantly? European Geosciences Union, Vienna, 2006.
- Logistic curves derived from the application of Hubbert Linearization technique by Stuart Staniford (see this post).
- Results of the Loglet analysis.
- The Generalized Bass Model (GBM) proposed by Prof. Renato Guseo, I used his most recent paper (GUSEO, R. et al. (2006). World Oil Depletion Models: Price Effects Compared with Strategic or Technological Interventions ; Technological Forecasting and Social Change, (in press).). The GBM is a beautiful model that has been applied in finance and marketing science (see here for some background). The estimation in Guseo's article was based on BP data from 2004 (CO+NGL).
- The so-called shock model proposed by TOD's poster WebHubbleTelescope . You can find a

describtion of his approach on his blog here. The current estimate was done in 2005 based on BP's data.

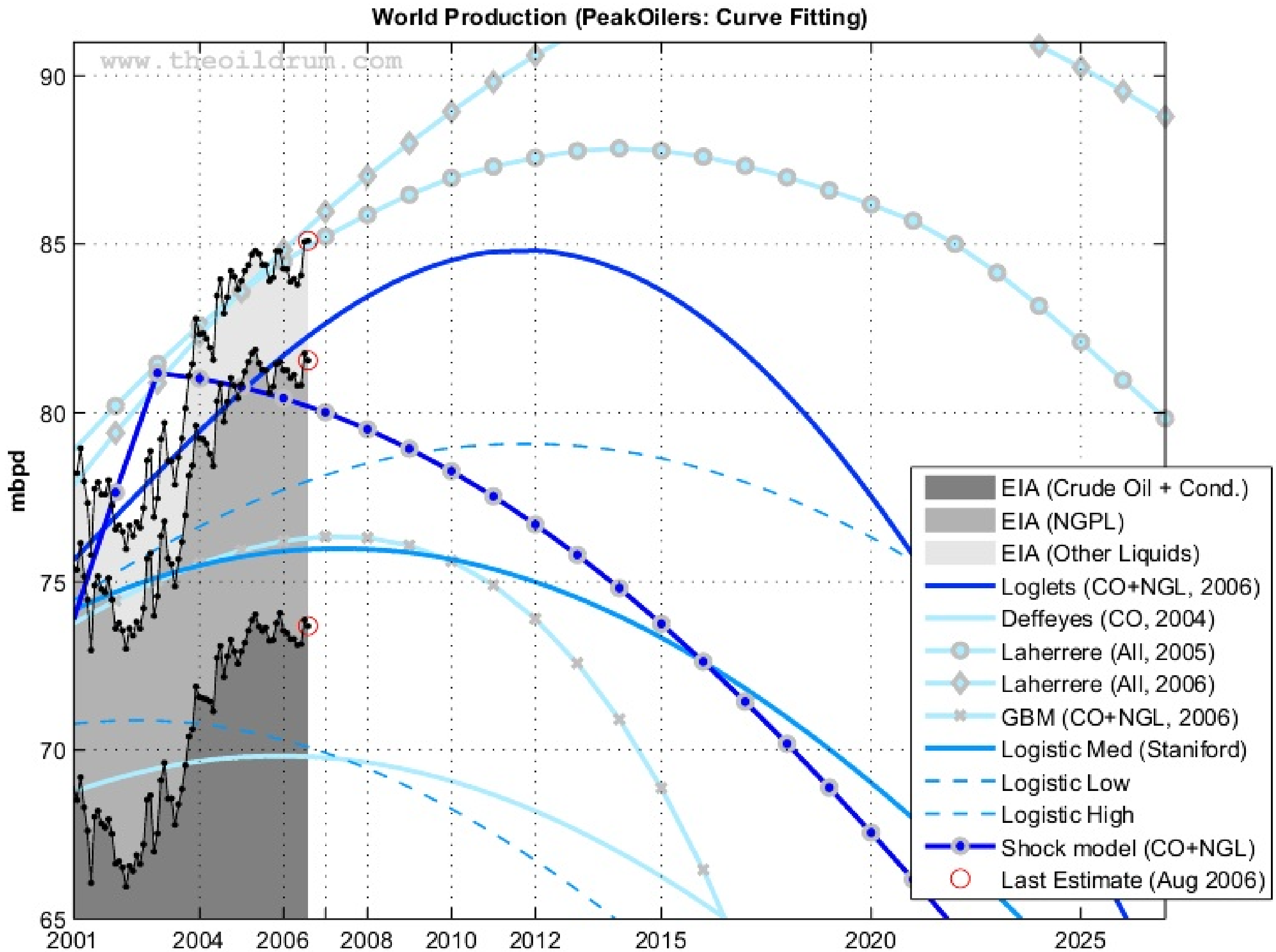

Fig 5.- Forecasts by PeakOilers using curve fitting methodologies. Click to Enlarge.

Production Growth

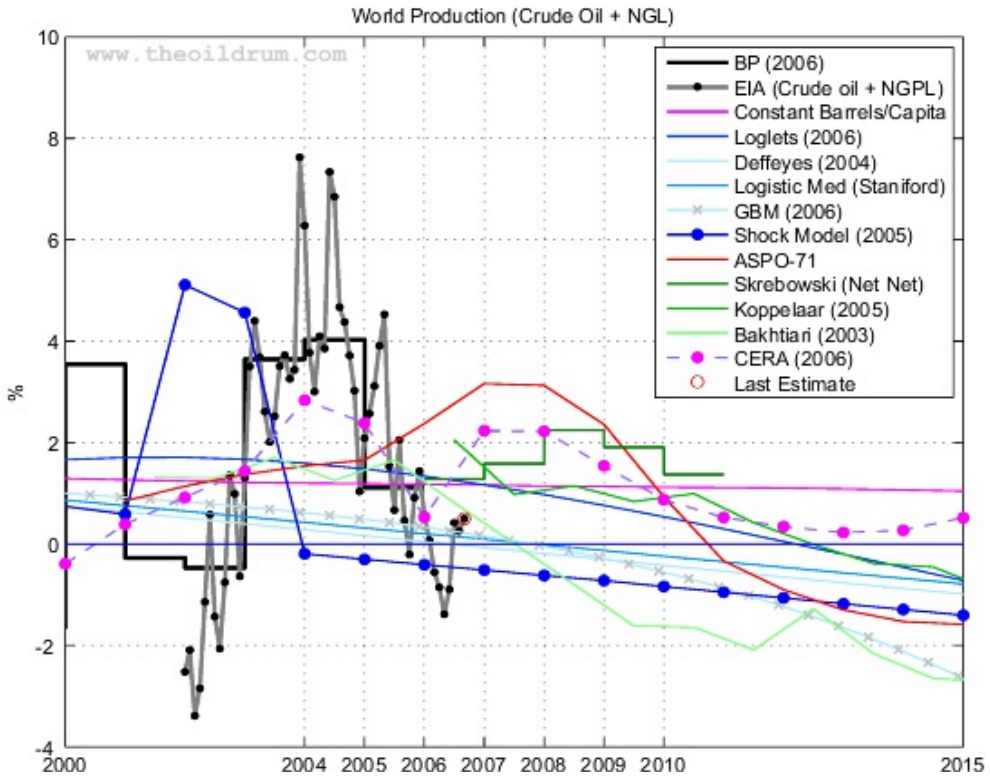

Fig 6.- Year-on-Year production growth. Click to Enlarge.

Forecast	2005	2006	2010	2015	Peak Date	Peak Value
All Liquids						
Observed (All Liquids)	84.41	84.30	NA	NA	2006-08	85.10
Koppelaar (2005)	84.06	85.78	89.21	87.98	2011	89.58
EIA (IEO, 2006)	82.70	84.50	91.60	98.30	2030	118.00
CERA[1] (2006)	87.77	89.52	97.24	104.54	2035	130.00
Lahèrrere (2006)	83.59	84.82	88.93	92.27	2018	92.99
Lahèrrere (2005)	83.59	84.47	86.96	87.77	2014	87.84
Crude oil + NGL						
Observed (EIA)	81.29	81.20	NA	NA	2005-05	81.87
ASPO-71	80.00	81.90	90.00	85.00	2010	90.00
ASPO-58	81.00	82.03	85.00	79.18	2010	85.00
ASPO-45	81.00	80.95	80.00	73.77	2005	81.00
Koppelaar (2006)	81.76	82.31	91.00	NA	2010	91.00
Bakhtiari (2003)	80.24	80.89	77.64	69.51	2006	80.89
Skrebowski (2006)	80.90	81.42	87.32	NA	2010	87.92
Staniford (High)	77.45	77.92	79.01	78.51	2011-10	79.08
Staniford (Med)	75.81	75.94	75.52	73.00	2007-05	75.98
Staniford (Low)	70.46	70.13	67.92	63.40	2002-07	70.88
Loglets	81.12	82.14	84.65	83.26	2012-01	84.80
GBM (2003)	76.06	76.27	75.30	67.79	2007-05	76.34
Shock Model (2006)	80.76	80.43	78.27	73.74	2003	81.17
Constant barrels/capita	78.81	79.73	83.42	88.01	2050	110.64

Crude oil + lease condensate						
Observed (EIA)	73.55	73.42	NA	NA	2005-12	74.06
CERA[1] (2006)	76.49	76.89	82.29	83.83	2038	97.58
ASPO-71	73.10	74.45	78.00	72.00	2010	78.00
ASPO-58	73.00	73.80	76.00	69.50	2010	76.00
ASPO-58	72.80	72.56	71.00	63.55	2005	72.80
Deffeyes (2004)	69.81	69.81	68.90	65.88	2005-12	69.82

Table II. Summary of all the forecasts (figures are in mbpd) as well as the last EIA estimates.[1]Productive capacities.

Next update in December.

Previous Update:

October 2006
September 2006