



## An Update on Mexico's Oil Production--The Rapid Collapse of Cantarell by the Numbers

Posted by [Sam Foucher](#) on January 31, 2007 - 12:30pm

Topic: [Supply/Production](#)

Tags: [cantarell](#), [eia](#), [iea](#), [mexico](#) [[list all tags](#)]

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Last year, I expressed my concerns about the eventual impact of a rapid collapse of Cantarell on Mexico's oil production (story [here](#)). The last production numbers from PEMEX seems to confirm the rapid decline of Cantarell as well as the inability of the Mexican to rapidly bring new production online. [The Wall Street Journal](#) (thanks to [Jerôme](#)) published an article on Cantarell last week:

The virtual collapse at Cantarell -- the world's second-biggest oilfield in terms of output at the start of last year -- is unfolding much faster than projections from Mexico's state-run oil giant Petroleos Mexicanos, or Pemex. Cantarell's daily output fell to 1.5 million barrels in December compared to 1.99 million barrels in January, according to figures from the Mexican Energy Ministry.

*[Update: PEMEX has just put out a press release this morning (thanks Nate!) saying that its crude oil production rose to 3.153 million barrels per day in January, up 6% from December, as it may have fixed a few of technical problems at Cantarell ([source](#)). Still, this last estimate put Mexico right back on the low logistic curve on Figure 5 below, so even with this news the decline is still quite apparent.]*

From the same article, the following chart says it all!

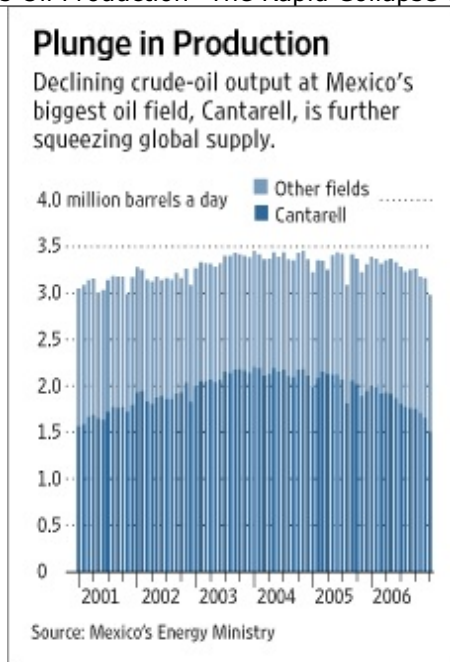


Fig 1. src: [The Wall Street Journal](http://www.theoil Drum.com/node/2226)

In December 2006, production went below 3.0 mbpd for the first time since 2001. We have to keep in mind that Mexico is the [second second source of oil imports](#) for the United States (before Saudi Arabia) with nearly 1.606 mbpd in 2006.

Below are shown two results of the [Hubbert Linearization](#) (HL) applied on the monthly Mexican production for crude oil + condensate: The first fit is based on production data from 1992 to 2006 (green points) and predicts an URR around 70 Gb with a moderate decline. The cumulative production at the end of 2006 is 34.9 Gb. The second HL (Figure 2) is more pessimistic but reflects the stronger production decline observed since 2005.

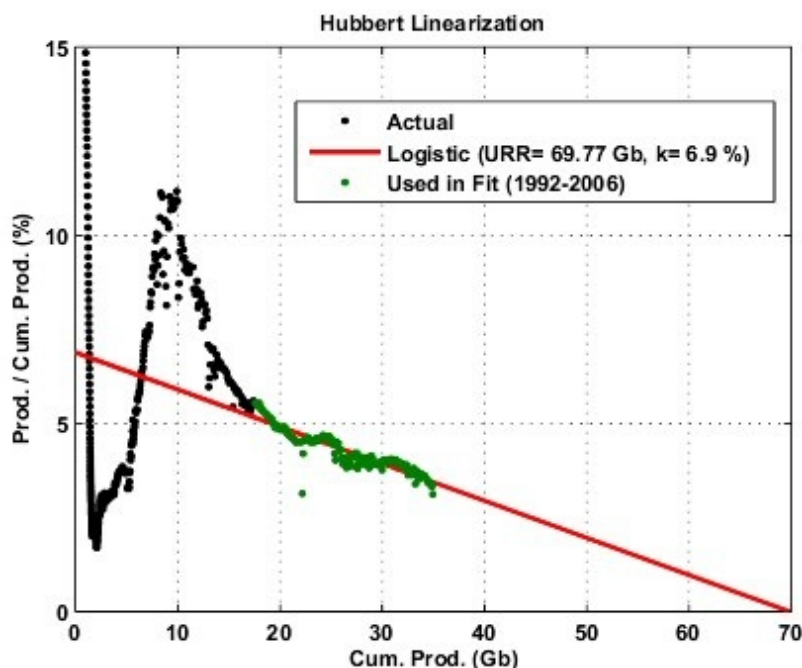


Fig 2. Result of the Hubbert Linearization on the monthly crude oil+condensate production using the years

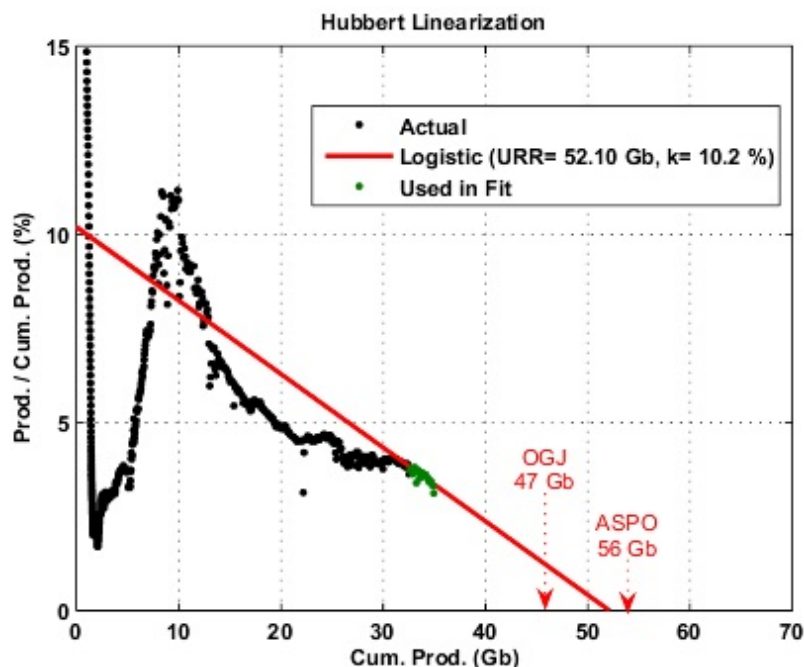


Fig 3. Result of the Hubbert Linearization on the monthly crude oil + condensate production using the years 2005 and 2006.

On Cantarell alone, the decline is quite impressive and the annual production decline rate could exceed 15% in the next few years.

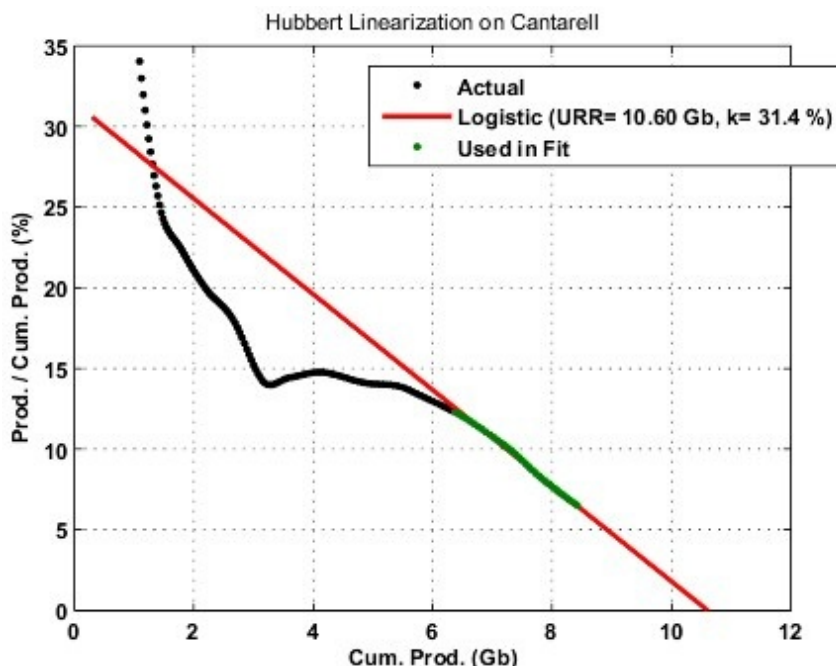


Fig 4. Result of the Hubbert Linearization on Cantarell's production.

On Figure 5, different forecasts for Mexico are represented:

- [IEA World Energy Outlook 2006](#) : forecasts for Crude Oil (Table 3.2, p. 94).
- [IEA World Energy Outlook 2004](#) : forecast for All liquids (Table 3.5).
- [EIA, International Energy Outlook 2006](#) : World Oil Production Capacity by Region and Country, Reference Case, High and low prices scenarios, 1990-2030 (Table E1, p. 155).

The recent drop in production since the beginning of 2006 has been very important (around 400 kbpd) and most forecasts have been overoptimistic. According to the logistic model (low variant) the production of crude oil could potentially cross domestic demand levels around 2013.

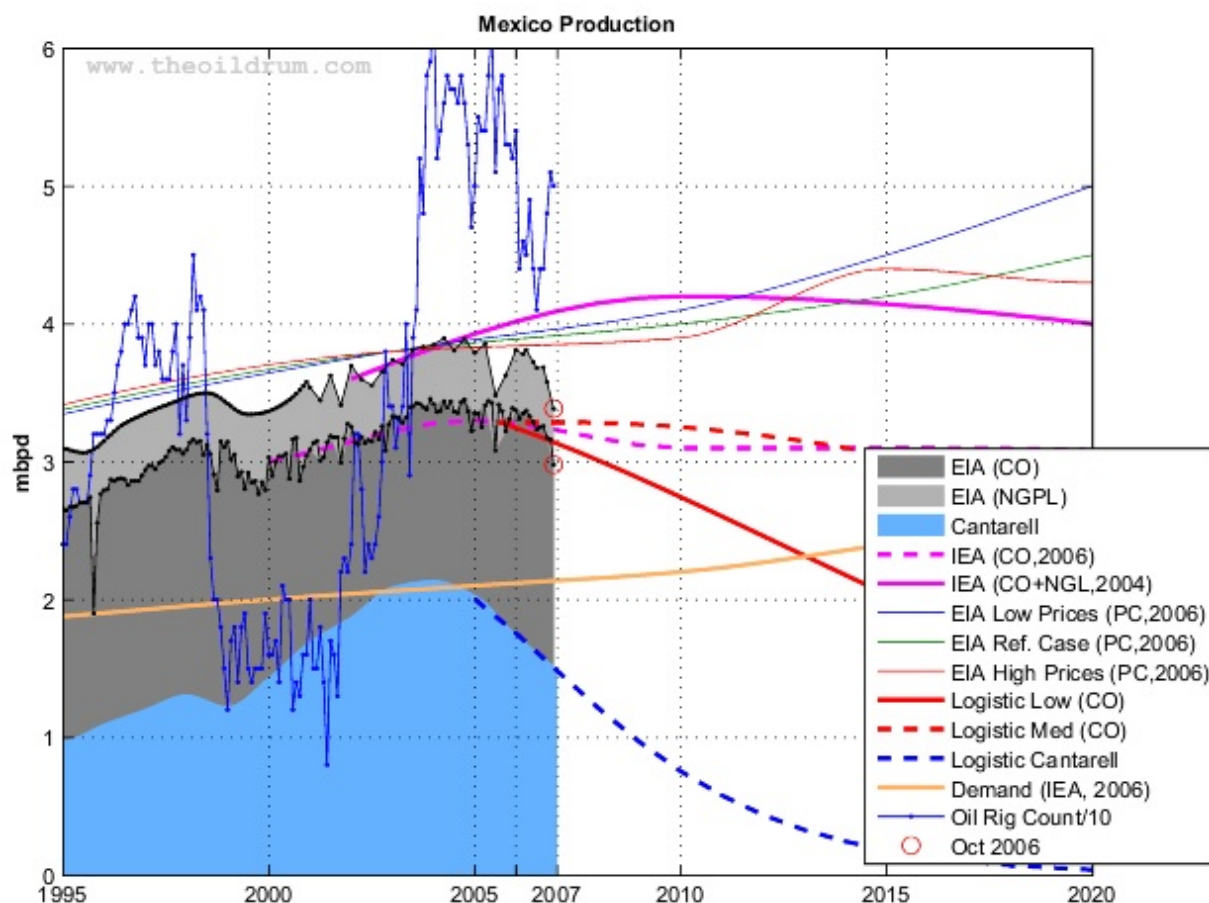


Fig 5. Mexico's oil production and various forecasts (data sources explained in the footnotes). PC= Productive capacities. Click to enlarge.

Some numerical values for the different forecasts shown on Figure 4 are given in the table below.

Forecast	2005	2006	2007	2010	2015	Peak Date	Peak Value
<b>Crude oil + NGL</b>							
Observed (EIA)	3.69	3.68	NA	NA	NA	2004-02	3.90
IEA (WEO, 2004)	3.93	4.02	4.09	4.20	4.14	2010	4.20
EIA Low Prices <sup>1</sup> (IEO, 2006)	3.90	3.94	3.98	4.13	4.54	2030-01	5.80
EIA Reference Case <sup>1</sup> (IEO, 2006)	3.88	3.90	3.93	4.02	4.22	2030-01	5.10
EIA High Prices <sup>1</sup> (IEO, 2006)	3.84	3.85	3.86	3.93	4.40	2015-01	4.40
<b>Crude Oil + Lease Condensate</b>							
Observed (EIA)	3.27	3.25	NA	NA	NA	2004-05	3.45

IEA (WEO, 2006)	3.30	3.28	3.23	3.10	3.10	2005	3.30
Logistic Low	3.29	3.18	3.06	2.66	1.96	1999	3.63
Logistic Medium	3.28	3.29	3.29	3.24	3.01	2006	3.29
<b>Demand</b>							
IEA (WEO, 2006)	2.10	2.12	2.14	2.20	2.40	2030	3.10
<b>Cantarell</b>							
Observed	1.91	1.63	1.50	NA	NA	2004-01	2.14
Logistic Cantarell	2.00	1.76	1.48	0.75	0.18	2003	2.28

Table I. Production figures in mbpd.<sup>1</sup>Productive capacities.

## The Bottom Line

Figure 6 below is summarizing the situation. Since 2004 (peak year):

1. Mexican gasoline prices have increased by 20%.
2. oil production has dropped by 11%.
3. oil rig count has decreased by 20%.
4. Cantarell's production has dropped by 30%.
5. domestic oil demand has increased by 2.5%.

By 2012:

1. oil production may have dropped by 30%.
2. Cantarell's production may have dropped by 80%.
3. domestic oil demand may increase by 10%.

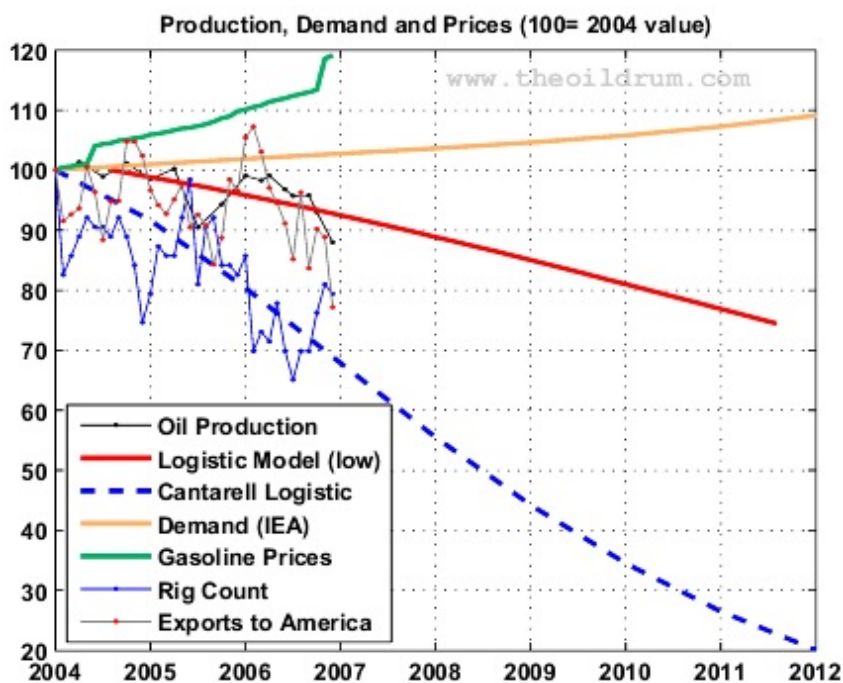


Fig 6. Production, demand and prices in January 2004 values. Click to enlarge.

### Footnotes:

*Production data sources:*

- 1857-1958: from "API Facts and Figures Centennial edition 1959".
- 1959-1964: from "Twentieth Century Petroleum Statistics 2004" of DeGolyer & MacNaughton.
- 1965-2005: [BP Statistical Review of World Energy](#).
- EIA monthly data for NGPL production (1992-2005).
- EIA data (Monthly Energy Review) for crude oil + condensate (1973-2005)
- Monthly estimates from [PEMEX](#) for 2006.
- Rig count from [Baker Hughes](#).

*Notations:*

- mbpd= Millions of barrels per day
- Gb= Billions of barrels ( $10^9$ )
- Tb= Trillions of barrels ( $10^{12}$ )
- NGPL= [Natural Gas Plant Liquids](#)
- NGL= Natural Gas Liquids (lease condensate + NGPL)
- URR= Ultimate Recoverable Resource

### Further Reading:

[Dave Cohen, Trouble South of the Border -- Mexico's Oil Production, TOD](#)  
[Khebab, Potential Impact of Cantarell's Decline on Mexico's Oil Production, TOD](#)  
[Khebab, Mexico's Ability To Export Oil, GraphOlogy](#)  
[Tom Standing, Mexico's Cantarell field: how long will it last?, Energy Bulletin](#)  
[ASPO, Country Assessment - Mexico](#)



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