

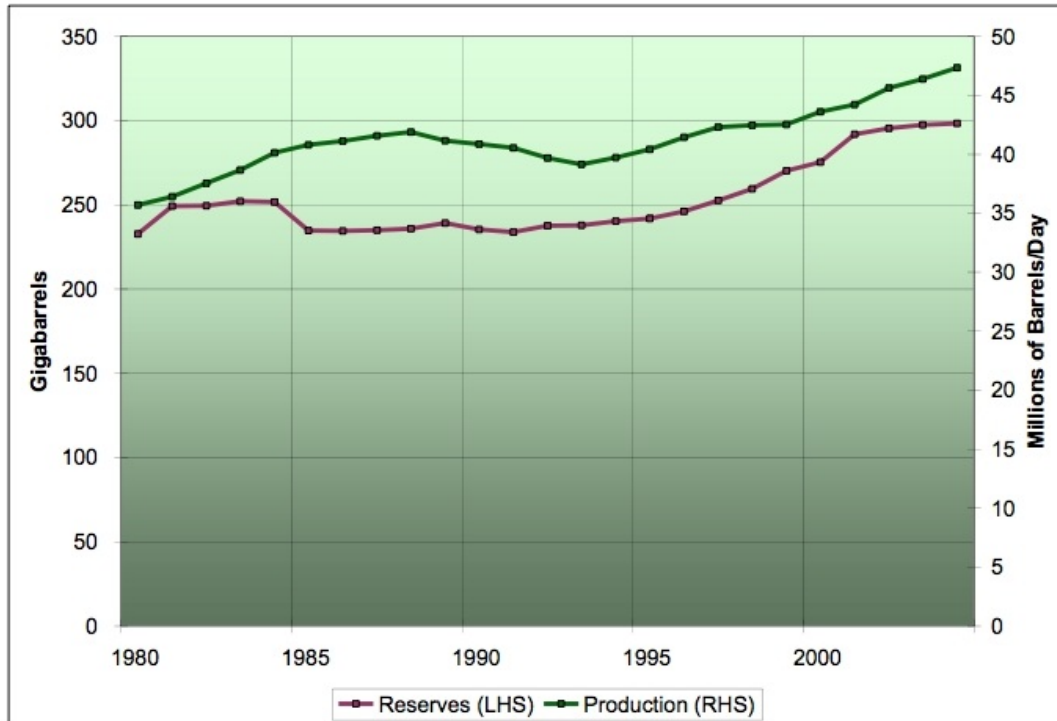


## Do Oil Reserves Tell Us <i>Anything</i>?

Posted by [Stuart Staniford](#) on April 29, 2006 - 12:56am

Topic: [Supply/Production](#)

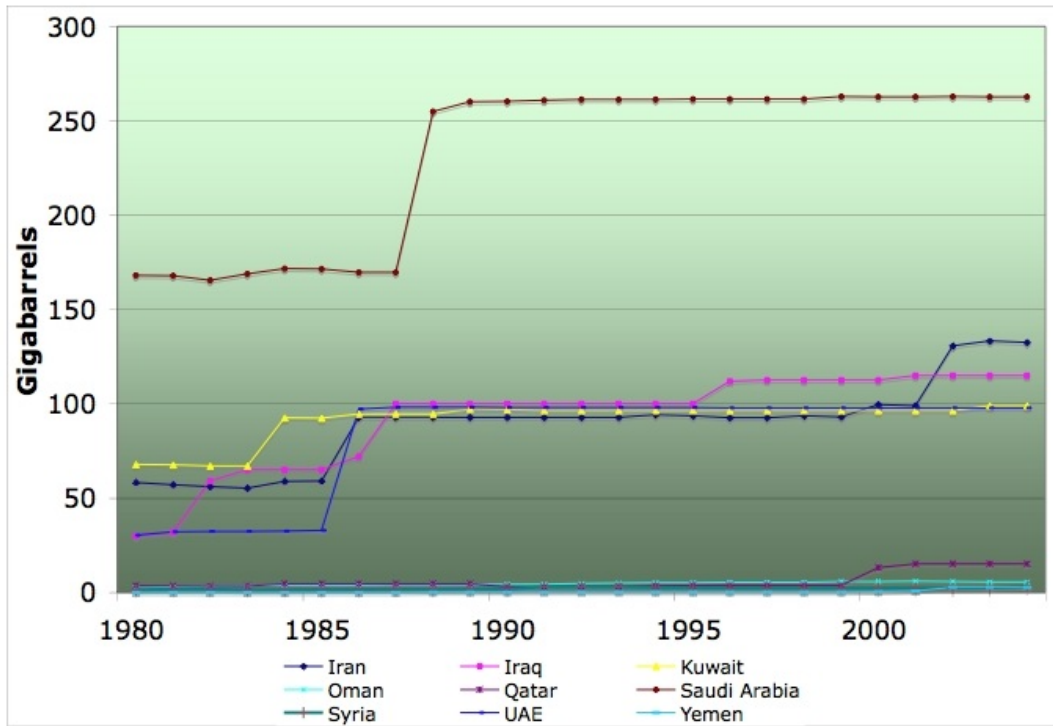
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*History of global proved reserves excepting OPEC in billions of barrels (also known as Gigabarrels = Gb. A barrel is 42 US gallons) on the left scale, with global production excluding OPEC on the right scale. Source: [BP Statistical Review of World Energy](#). [Click to enlarge](#).*

Maybe.

Of course, the reason to ignore proven reserves numbers is that two thirds of the global total rests with characters like these:



*History of claimed proved reserves for various Middle Eastern countries. No major discoveries in these countries were announced in the 1980s. Source: [BP Statistical Review of World Energy](#). Click to enlarge.*

The only thing proven by these time series is that the sources of the data are dishonest and we won't be certain of anything useful about the situation until long after the fact.

But is there anything useful to be extracted from the rest of the world's data? After all, reserves data in other countries are covered by legal or professional standards which might count for something (Bubba wrote a [nice summary](#) a while back). I decided to take a look at the BP history of claimed proven reserves for various countries of interest.

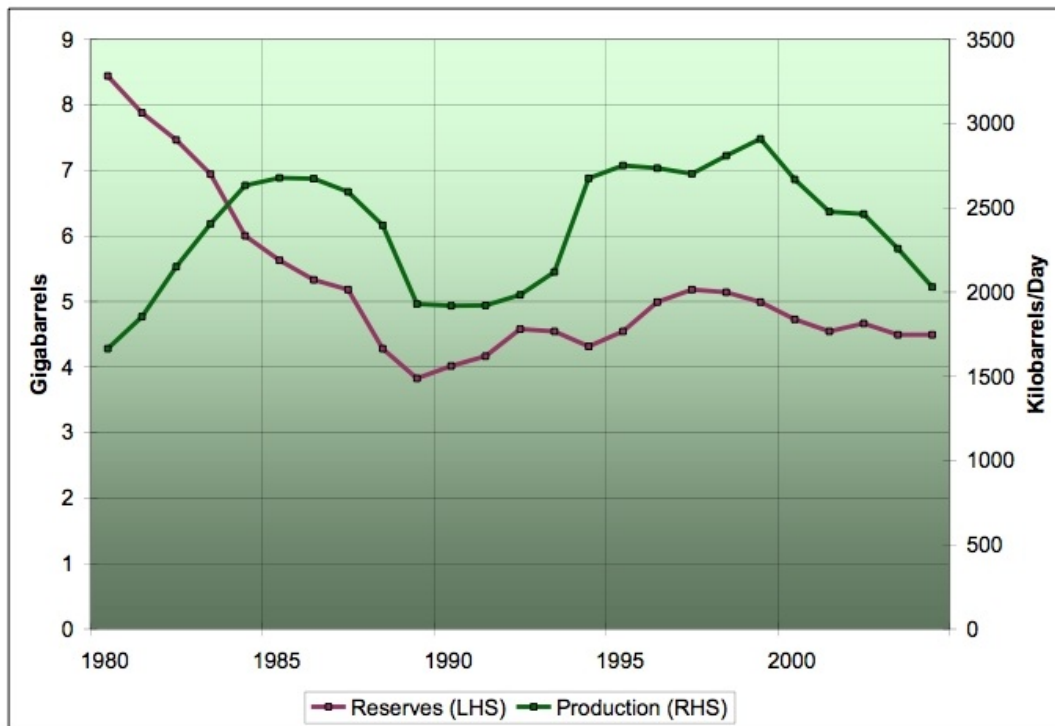
Now, I note several cautions. Firstly, the data only extend from 1980-2004, and are annual numbers. Secondly, BP say as to the source of the data:

Notes: Proved reserves of oil - Generally taken to be those quantities that geological and engineering information indicates with reasonable certainty can be recovered in the future from known reservoirs under existing economic and operating conditions.

Source of data: The estimates in this table have been compiled using a combination of primary official sources, third party data from the OPEC Secretariat, World Oil, Oil & Gas Journal and an independent estimate of Russian reserves based on information in the public domain. The reserves figures shown do not necessarily meet the definitions, guidelines and practices used for determining proved reserves at the company level, for instance those published by the United States Securities and Exchange Commission or recommended for the purposes of UK GAAP, nor do they necessarily represent BP's view of proved reserves by country.

So, we don't really know what these various time series are, but, with that caveat, let's go ahead anyway. I made a variety of graphs which show the reserves over time (plum colored lines) on

I started with countries that are known to have peaked in the 1980-2004 timeframe so we can see what peak looks like from a reserves perspective. Let's lead with the UK:

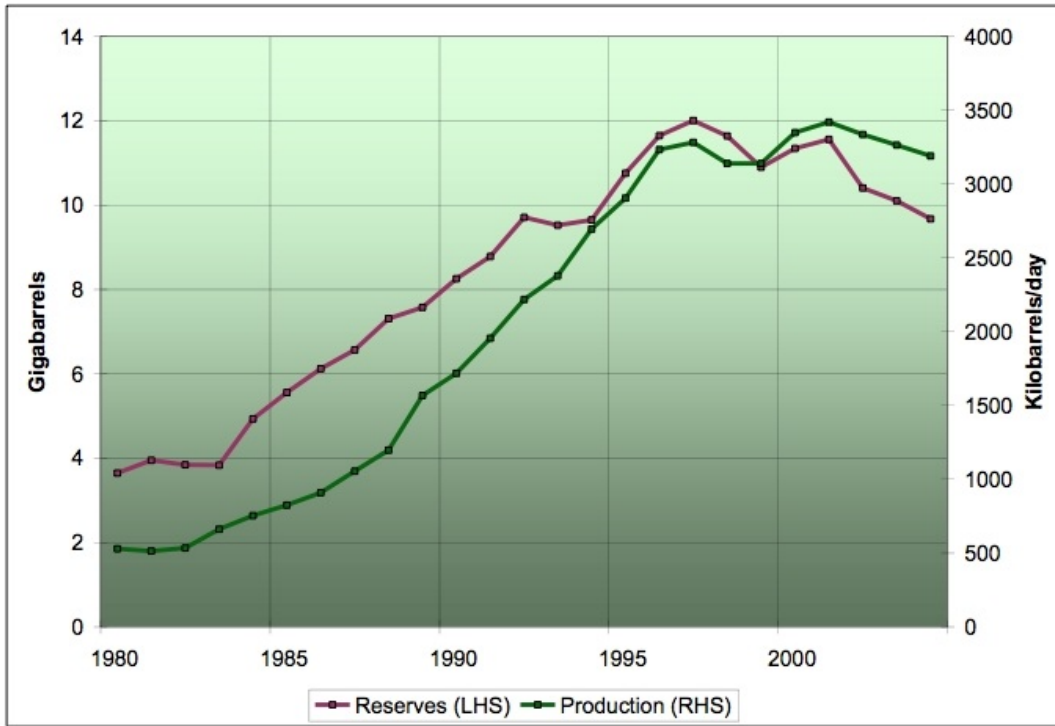


*History of UK claimed proved reserves (plum, left scale) and average daily production (green, right scale). 1980-2004. Source: [BP Statistical Review of World Energy](#). Click to enlarge.*

So what I see in this data is that changes in the reserves tend to lead changes in the production. As we start in the 1980s, reserves are dropping steadily, which leads to a production peak in 1985-1986. However, then the second wave of UK North Sea discovery hits (we've [discussed this before](#)), and reserves start to go up again, with production increasing again shortly after. Reserves peak for the second time in 1995, and the second peak in production occurs two years later in 1997. Since then, reserves have been dropping steadily but gradually, while production has been plummeting.

Clearly, there is not a precise quantitative relationship, but it generally seems that when it gets hard to grow the reserves, it fairly soon gets hard to grow the production too.

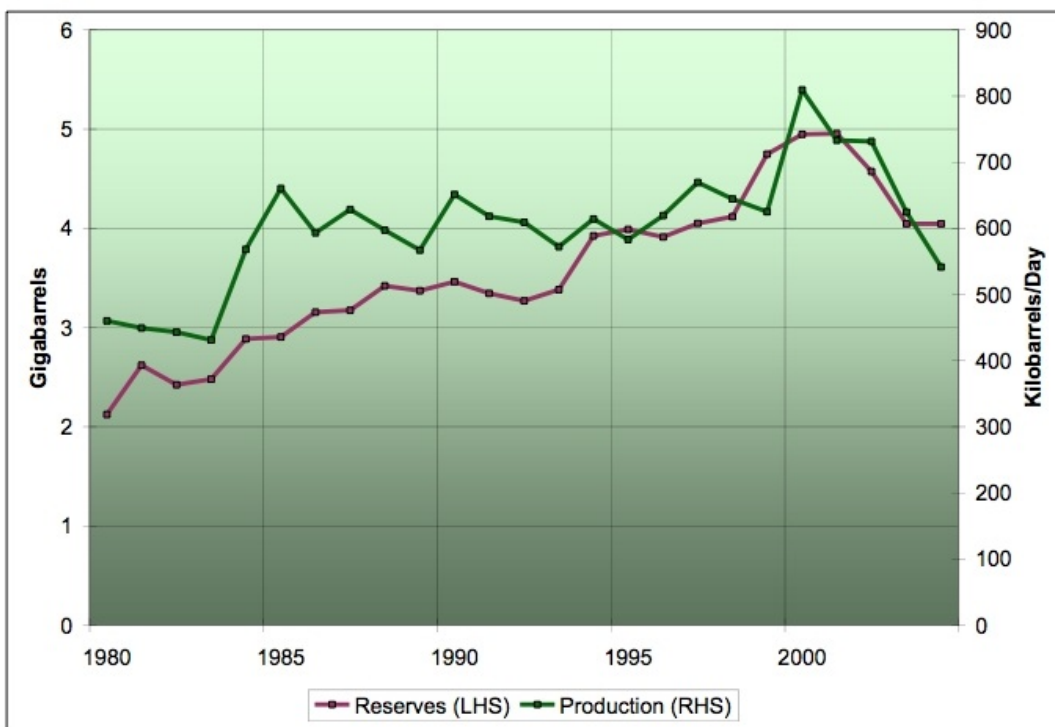
What about Norway?



History of Norwegian claimed proved reserves (plum, left scale) and average daily production (green, right scale). 1980-2004. Source: [BP Statistical Review of World Energy](#). Click to enlarge.

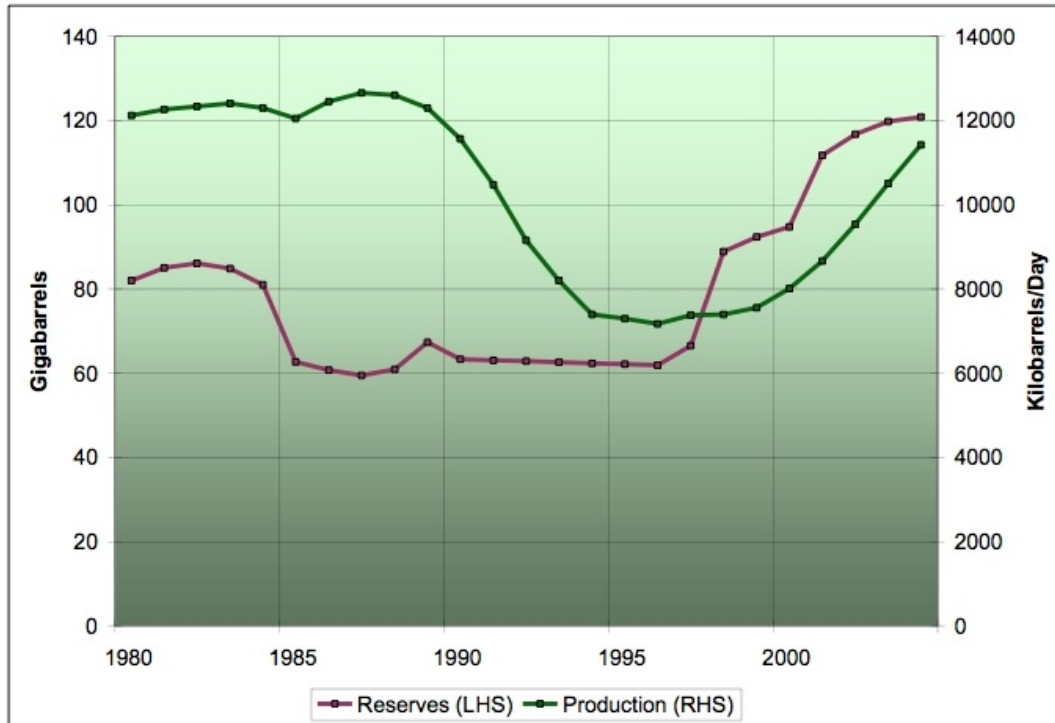
Well, there's a somewhat similar pattern, except without the lag. When reserves are growing, production is growing, while when reserves start to shrink, production starts to shrink too. In Norway, the reserves don't provide us with any warning, however. Also, in contrast to the UK, post-peak the reserves are shrinking faster than the production.

Another country that peaked in the same timeframe is Australia:



Australia seems to work like Norway. Reserves grow in rough co-ordination with production growing, and then as reserves peak and decline, production does too.

Next comes the Former Soviet Union.

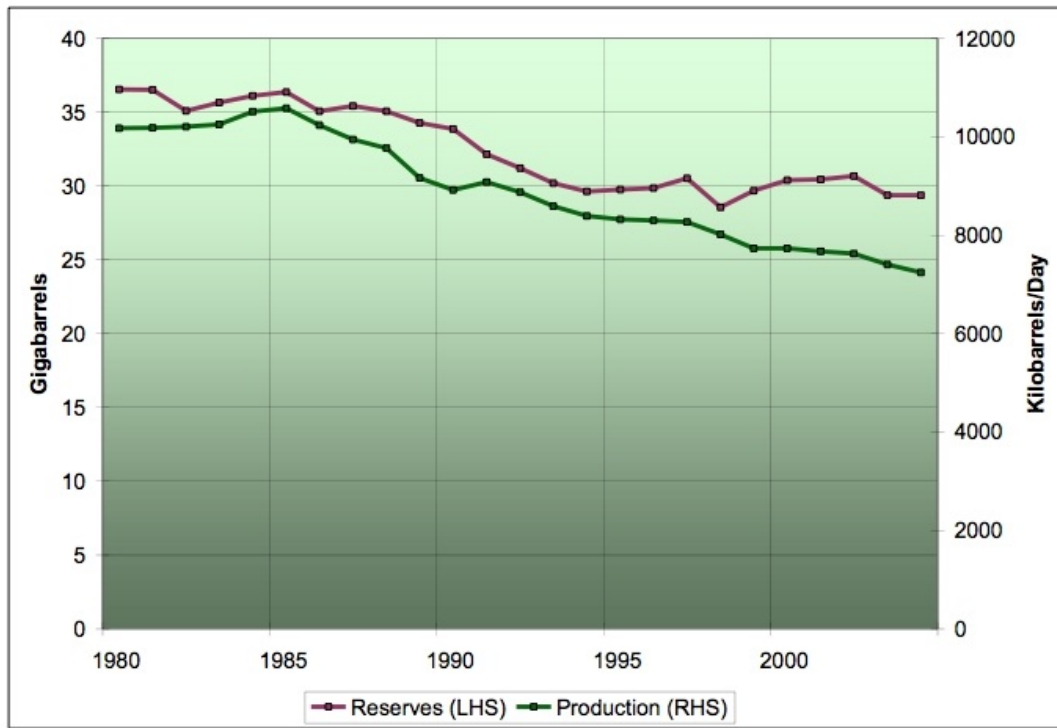


*History of Former Soviet Union claimed proved reserves (plum, left scale) and average daily production (green, right scale). 1980-2004. Source: [BP Statistical Review of World Energy](#). Click to enlarge.*

The FSU is more like the UK. There's a clear decline in the reserves in the 1980s which predicts the production peak in 1989 (which tends to argue for the [Douglas Reynold's theory](#) that the Soviet oil crisis caused the societal collapse, not the other way round). Then the reserves start to really improve in 1997, which leads the improvement in production by 1-2 years. The reserves increase has been leveling off for several years now, which suggests that Russian production increases do not have much further to run (as the Russians themselves have been warning).

Note, Russia is exceptionally important in the overall picture. The great bulk of global production increases since the post-crash trough in production in 2001-2002 has come from just two countries: Russia and Saudi Arabia. The Saudi's stopped increasing some time ago, so Russia is by far the leading hope for folks who'd like to believe there will be significant production increases from here out.

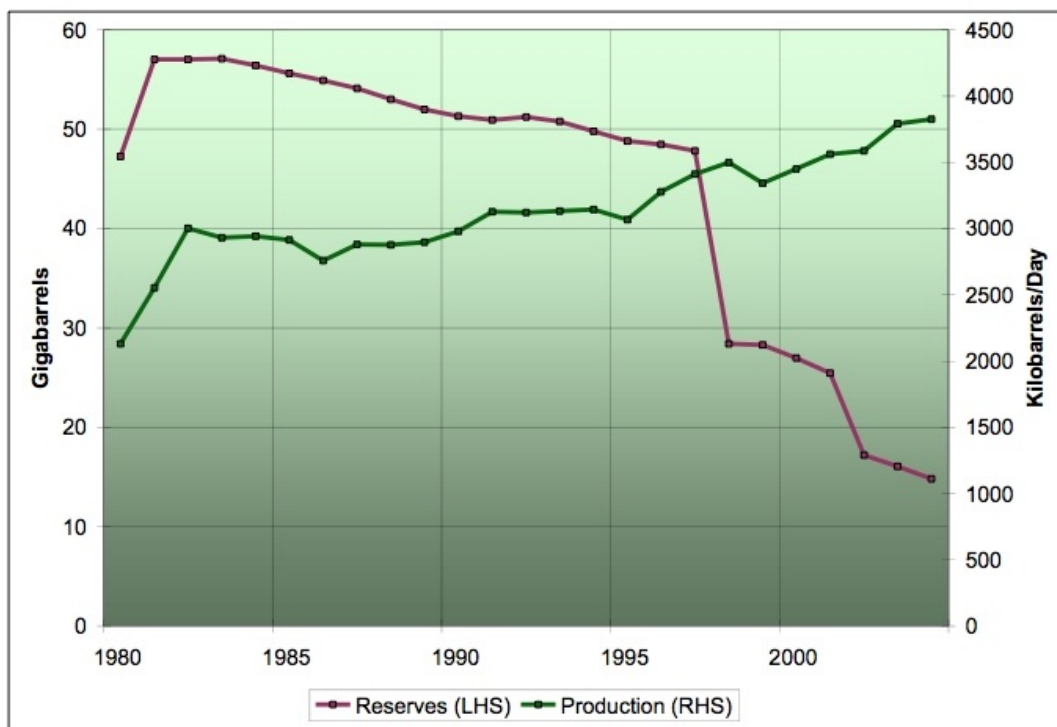
If we look at the US - obviously the US was post-peak before the data begin:



History of US claimed proved reserves (plum, left scale) and average daily production (green, right scale). 1980-2004. Source: [BP Statistical Review of World Energy](#). Click to enlarge.

And indeed we see that reserves and production have generally declined together for 25 years. The one caveat is that the slight bump in reserves in the early 2000s (which I take to be due to deepwater Gulf of Mexico) did not lead to much if any amelioration in the production decline.

Finally, we look at Mexico, which is interesting because they themselves have been forecasting that their production was likely to go into decline shortly.



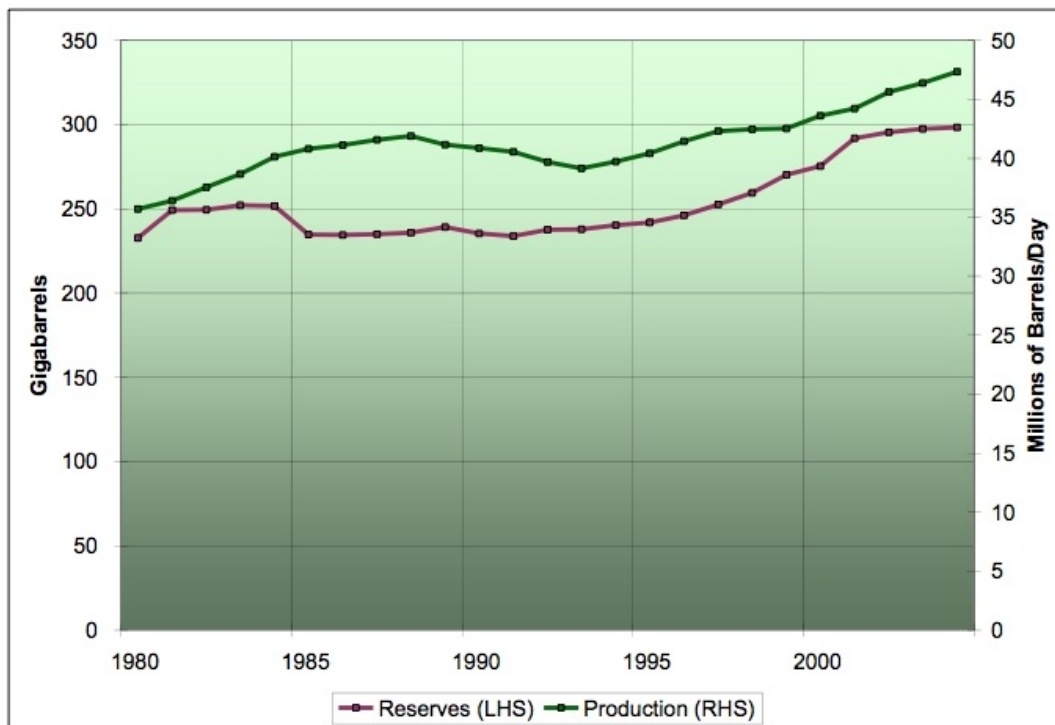


I guess Mexico is the exception: reserves have been declining increasingly precipitously, but production has not (through 2004). I imagine part of the reason is that more than half of Mexico's production is from Cantarell, and the wells are at the top. The reserves graph suggests what West Texas has been emphasizing: the declines here are likely to be horrendously fast once they start.

However, there's something else going on here. It looks like they've been writing off a lot of their reserves (which were perhaps inflated earlier). Eg from 1997 to 1998 they dropped 20Gb, even though they only produced about one Gb. That's a lot of oil to just evaporate! (Note that 1mbpd for a year is 0.365gb, so it takes a little less than 3000kbpd to use up a Gb in a year).

There may well be more reserves to be added in Mexico. OTOH, they might not be done with write-downs yet - they wrote-down a lot more than production in 2002 also.

Finally, we have the whole Non-OPEC picture:



*History of global proved reserves excepting OPEC in billions of barrels (also known as Gigabarrels = Gb. A barrel is 42 US gallons) on the left scale, with global production excluding OPEC on the right scale. Source: [BP Statistical Review of World Energy](#). Click to enlarge.*

On the whole, reserves trends here seem to lead production changes, and the slowing in reserve increases from 2002 on seems to have successfully forewarned of the production plateau that started in late 2004. What we don't see is a sharp recent upturn in reserves getting ready to support the CERA storyline that the world will soon have plenty of oil production again.

All-in-all, these couplings are imprecise, but there seems to be at least a qualitative argument to suggest that the trends in proven reserves are consistent with the idea that we are close to the peaking of global production, unless someone comes up with a bunch of new discovery somewhere.



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