

***A REALITY CHECK ON THE WORLD'S OIL SUPPLY AND DEMAND:  
ARE THE CURRENT PERCEPTIONS OF WEAK DEMAND  
AND AMPLE EXCESS CAPACITY CORRECT?***

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## **A REALITY CHECK ON THE WORLD'S OIL SUPPLY AND DEMAND: ARE THE CURRENT PERCEPTIONS OF WEAK DEMAND AND AMPLE EXCESS CAPACITY CORRECT?**

For much of the past year, an increasingly bearish mood has once again settled over oil markets and oil prices have been very weak. This is great news for consumers and a real boost for the weak economies around the globe. Some oil experts even argue that it is good news for most oil producers, including OPEC, because low prices boost demand while high prices hurt demand and bring on too much supply of both oil and alternate energy sources.

Only a year ago, oil prices hovered in the \$30 range until late spring when mounting worries of weak demand and estimates for strong production increases remedied this high oil price "problem." After 9/11, prices really collapsed. Recently, a \$17.50 price floor has been tested several times, bringing oil to its lowest price in over two years.

Many argue that current prices are still higher than they should be. The latest IEA numbers show world oil demand for 2001 grew by a mere 100,000 barrels per day, the lowest increase since 1985. While demand flattened, non-OPEC supply "soared" by 700,000 barrels per day, setting a new high supply record. The IEA estimates that December 2001 non-OPEC supply was 47.9 million barrels a day.

For the past five years, non-OPEC supply seemed mired in a tight range of 44 to 45 million barrels a day, far below the 50 million barrel per day level which so many oil analysts in the mid-90s seemed to think would be easy to reach by now. These recent numbers might indicate that the long overdue supply surge is finally beginning to arrive.

The IEA's January report also noted that the United States would once again become the world's number one oil producer in 2002 if other liquids are added to crude oil produced, thereby relegating Saudi Arabia to second place for the first time in years. Russia's surging production will enable this once free-falling oil producer to climb within 800,000 barrels per day of Saudi's total. The IEA's comments suggest that this might be "just dues" for the Saudis (and their other OPEC partners) since their greed forced oil prices far too high in the first place.

Commodity speculators, who love to gamble on oil prices, (one of their favorite new ways to coin money) have relished all this bearish news. The pre-Christmas 2001 report showed that, speculative shorts of NYMEX oil contracts were seven to one over longs, bringing the total "non-commercial" shorts to almost 84,000 contracts. This represents a multi-billion dollar bet that an oil price of \$19 was far too high. The speculators were almost constantly net short on their oil contracts during 2001. This pattern continues into the first month of 2002.

When oil prices fell to \$17.50 (a 50% drop), it marked the fourth major oil price collapse in the past decade. The first collapse occurred after Kuwait was freed. The next two price collapses, one in 1993 and the other in 1997-1998, were accompanied by widespread reports of massive and sustained oil gluts and predictions that OPEC itself was finally on the ropes. During both price drops most experts predicted that \$10 or

lower prices would last for years. On both occasions, a few brave souls boldly predicted that the price collapse would be permanent.

As we now know, both of these painful and debilitating collapses turned out to be short-lived. In the first six months in 1994, oil bounced from \$13 back to \$20 where it was a year earlier. There was never any glut. It was merely the unwinding of a massive short position by a relatively small trading firm that caused the price of oil to suffer such a fall.

The 1997-1998 collapse was far more complex. It lasted longer and the price dropped further. It became the worst drop in oil prices in over 50 years. The causes were widely known: a combination of the Asian 'flu, Iraq re-entering the markets and OPEC foolishly overproducing created a massive glut of oil nobody wanted.

During this painful time, there was one puzzling discrepancy. Most of this widely publicized glut was apparently hiding somewhere. The IEA described this phenomenon as "Missing Barrels". At its high watermark, the world had "lost" over 700 million barrels of oil if the supply excesses shown in the IEA's oil model and almost everyone else's models were correct.

In reality, one cannot lose this amount of oil. There is simply no place in the world to even store it. The United States has the largest complex of tank farms in the world and the largest network of oil pipelines. Together, these facilities can hold less than 300 million barrels. To think that someone had more than twice this storage available as the 1997/99 oil glut began was somewhat naïve. Virtually everyone in the global oil industry either ignored this issue or believed that these "Missing Barrels" really did exist (even though they could not say where they were.)

In retrospect, the "Missing Barrels" were non-existent. Like 1993, there was never any giant oil glut. There is no question that there was ample spare heating oil in the United States and Europe, and perhaps an additional 1.5 - 2 days of some other key oil stocks, but to think that a massive oil glut was hovering over the markets was completely wrong.

This history lesson raises a question about today's gloomy oil outlook. How real is all the seemingly bad news? Is there any solid ground to argue that we might be experiencing the third consecutive "false" oil collapse of the past decade? The answer to all this would be easy and apparent if the world had solid, precise data on oil's demand and its supply, and precise data on the global oil stocks. Sadly, this is not the case.

Many oil observers, including quite a few prominent experts, assume that the world's oil data is very precise. It never ceases to amaze me how oil prices can rise or fall by a dollar or two, simply as a result of a one or two percent change in a weekly American Petroleum Institute (API) report on USA oil stocks. The traders and speculators often assume these numbers are either a good proxy for global stocks or think they are global numbers.

The reality of the world's oil data is that there are many imperfections. Some will probably never be remedied, others can be changed if the industry finally takes this issue of bad data seriously.

Oil demand to any degree of precision is only available year or two after the fact. Oil supply on a company-by-company basis cannot be measured, even on a monthly basis, to an accuracy better than plus or minus 2 to 5 percent. For older fields, the variance is almost never a plus.

Nonetheless, all this inaccurate data is aggregated into computer models and reported in excruciating detail. Most published global supply and demand estimates end in odd numbers with an implied accuracy of 1/10<sup>th</sup> of 1 percent.

If public company oil production estimates are hard to obtain, very accurate OPEC numbers are far more oblique and are subject to wild guesses. The media reports of OPEC's exports and daily production come from various third party sources. All of them begin their estimates by assuming that OPEC's internally generated numbers are wrong. Most of these third party estimates rely on data from one of two independent tanker traffic consultants who watch tanker loadings and the water levels from tanker plumb lines through binoculars and then translate this into what they think is being produced by each country every month.

There is nothing wrong with any of this oil data system as long as all the parties know how inaccurate the reported numbers can be. Unfortunately, today's oil markets do not operate this way. The commodity markets perceive this data to be very precise and very important. Tiny changes in reported U.S. inventory levels roil the worldwide oil markets. A crude stock build, or draw as much as 5 million barrels can change the prices of crude by \$3 or \$4, even though the number represents only 1.7% of U.S. crude stocks and 6/10ths of 1% of OECD stocks. Moreover, the number itself could be wrong!

Data revisions rarely get any notice, even when they are made only a week later. All the big revisions in U.S. data only get reported in the summer following the end of the prior year, and are rarely even glanced at.

Why this data topic is of extreme importance is that, once again, there are massive "Missing Barrels" in most of the published supply/demand figures for 2000 and 2001. According to the IEA's latest numbers, the world started to experience supply excesses in the 2<sup>nd</sup> quarter of 2000. These theoretical surpluses have lasted throughout 2001. According to the latest IEA numbers, in the course of seven quarters ending this past December, the world produced almost 670 million barrels of oil more than we consumed.

In a déjà vu reminiscent of 1998, two-thirds of this glut has never shown up. The OECD oil stocks have grown by 220 million barrels since March 31, 2000, but another 445 million barrels of oil have to be lurking somewhere outside the OECD's recorded stocks for this glut to be real. It is simply a physical impossibility to "hide" this much oil, either in the OECD or outside our system. There is no place for even 15% of this amount to be stored.

This argues that the excess supplies embedded in most 2001 supply/ demand models have been overly pessimistic, just as they were in the fall of 1993 and again from late 1997 through early 1999. Pinpointing the sources of this error is a harder task.

The IEA's Missing Barrels of 1997/1998 were never found. They still carry a 1.6 million barrel per day plug figure in their 1998 model and another 900,000 barrels per day "Miscellaneous to Balance" in their 1997 numbers.

There is no question that some elements of current demand have been weak, and that some new supply occurred. But one or both of these two market driver estimates are wrong to some degree. It could be a combination of both. These dynamics could also set the stage for a repeat of 1999, when a real and swiftly executed OPEC production cut led to a tripling of oil prices as the giant glut that everyone assumed was so real turned out to be an illusion. The oil markets in the spring of 1999 were relatively tight and a cut of less than three percent sent prices spiraling up.

Could today's oil market actually be quite tight? Here are various pieces of data to think about.

On the demand front, jet fuel use is clearly lower than a year ago. Motor gasoline demand, on the other hand, continues to grow. Fortunately, gasoline consumption is many times greater than that of jet fuel. Heating oil demand in Europe has been very high. U.S. heating fuel demand compared to a year ago suffers because last year's winter was unusually cold and natural gas prices were sky high.

From the best records now available, petroleum demand in the U.S. for 2001 ended up virtually tied with 2000 demand, though various finished products had much higher demand while others were lower. This condition also existed in 2000, when an all-time record for U.S. oil demand was set.

A detailed demand analysis also highlights that weather still has a more profound impact on both oil and total energy demand in most countries than changes in each country's GDP.

On the supply side, non-OPEC production did grow (or at least everyone's supply models indicate a production growth.) The enormous supply surprise was Russia's unpredicted production turnaround. For over a decade, Russia, and the rest of the former Soviet Union (FSU), suffered continual production declines, falling from a peak in 1988 at 12.5 million barrels per day, to just over 7 million barrels per day at the low point in 1996. FSU supply remained in this range through the end of 1999. Over the next two years, FSU supply suddenly increased to 8.8 million barrels per day. This surprising (and unforecast) turnaround accounted for 60% of all non-OPEC production growth over the past three years.

The FSU turnaround took every oil expert by surprise. Oil analysts' FSU supply models now get adjusted each month. Many now assume this rise is just getting traction. Reports abound on how Russian and Central Asian oil will ultimately sink OPEC. The last time there was so much FSU oil hype was a decade ago when the Caspian Sea was discussed as a "New Middle East." Over 20 successive dry holes quieted this talk for some time, but it is now coming back with a vengeance.

Several questions make the Russian oil miracle suspect. First, there are no reliable oil statistics in the FSU. All published production data now comes from what the big Russian oil companies say they produce. Since even Exxon or Shell can be off by 3 to 5% in their supply numbers, some errors could simply be accidental. But, there is another reason their production numbers might be overstated.

Each oil company is restricted in the amount of oil it can export based primarily on a fixed percent of what it produces. As a result, there is a possible incentive for each production association to slightly fudge their production figures so they can maximize exports to western markets. This has two advantages. First, you get paid in dollars at world scale prices. Second, you actually get paid!

Some of Russia's production growth is undoubtedly real, but it also might be a one-time event. When the Ruble was devalued four-fold oil prices subsequently soared, and created a Russian arbitrage where expenses to conduct workover and other remedial activities fell almost four-fold while the price of oil, assuming one could export, soared. This undoubtedly created some production gains that were simply picking low-hanging fruit. How sustainable these activities are in maintaining Russia's supply growth will be interesting to watch.

It will also be interesting to get a better grasp on Russian oil demand. Strangely, it remains close to its low point, even though the Russian economy has boomed over the past two years.

The biggest challenge to continue this production growth is that an average Russian oil well now produces only around 50 barrels of oil each day, a far cry from typical Middle East wells, which still average in the 1,500 to 4,000 barrels per day range. Almost every sizable Russian oilfield also has high water cuts. Few were spared this jinx. There are few new giant projects being developed. In my opinion, Russia's current numbers need to be taken with a grain of salt and it could soon become a tough challenge for Russia to maintain their current output.

The other important non-OPEC supply issue is whether the North Sea, where much of the net non-OPEC supply growth occurred during the 1990's, is now peaking. The U.K. sector has now peaked and is beginning to decline. For most of 2001, oil production struggled to stay just over 2 million barrels per day. Almost every month's reported production was significantly lower than a year ago. Norway could also be close behind the United Kingdom.

The recent production data released by the U.K. on a field-by-field basis show lower production levels than current estimates of the IEA and others. The variance in November (the most current data available) is close to 300,000 barrels per day, a difference of 12.5%.

If the IEA's most recent non-OPEC supply numbers are accurate, it still turns out that over a five-year period from January 1997 to December 2001, including the past three years when oil prices averaged higher than in almost two decades, total non-OPEC supply, exclusive of the FSU, grew by only 1.9% or a grand total of 200,000 barrels per day. In the Fall of 1999, many oil experts were "sure" that non-OPEC supply would grow by 3.5 to 4.0 million barrels per day by 2001 if oil prices stayed at \$22 (and Russian growth was thought to be marginal.) This view turned out to be shockingly wrong. Luckily, Russia and OPEC seem to have bailed the world out of what could have been a real supply crunch.

OPEC's supply numbers are also more questionable than many people think. Over the past five years OPEC has announced big production increases, followed by substantial cuts, followed by large increases again and then three severe cuts during 2001, before

the biggest cut ever beginning this month. In theory, this caused OPEC's production to increase and then decrease by four to five million barrels a day.

Curiously, detailed government reports on OPEC's exports to the OECD, which historically make up over 80% of all OPEC exports, fail to correlate at all with either the magnitude of the announced increases or the announced production cuts. OPEC's exports to the OECD, if Iraq is excluded, stayed in a tight range, bouncing up and down by a range of 1.3 million barrels per day from the beginning of 1996 through the end of 1998, while crude prices swung from a high of \$27 to a low less than \$10. In April 1999, a big drop occurred, OPEC imports fell by 1.850 million barrels per day, a perfect correlation to both the timing and magnitude of their March 1999 cut. OPEC output stayed in this lower band for almost a year until imports began to soar as oil prices tripled and global markets got extremely tight. From the latest data, which only goes through last August, imports seem to have now settled back to the high end of the 1996 - 1998 levels. Absent from all this data is any sign to confirm most of the announced OPEC production increases or the announced OPEC cuts. These numbers do not tell the whole OPEC story, but OECD imports have almost always accounted for over 80% of OPEC exports, and these numbers represent official government data, not tanker traffic guesses.

Most OPEC observers blithely assume each OPEC country always produces more than they announce. There is a chance that the opposite is now true and that many of the individual countries now struggle to meet media-estimated production levels.

So, demand could be holding up better than many estimate, and supply gains by Russia, OPEC and some non-OPEC producers might be less than what most think. If so, perceptions are worse than reality. How strange it is that our global crude oil markets are now so heavily influenced by energy traders' skimpy and passionate perceptions of this market. Even more odd is that oil prices, the largest commodity market in the world, could be so greatly influenced by and tied to what has often turned out to be simply bad data. But, this is the market structure that evolved during the 1990s. In the fall of 1993, I spoke out several times on the strange new driver of our "Energy Bus" – the commodity speculator – and warned that we were likely in for a wild ride. But, its velocity and recklessness has surpassed my wildest expectations.

Each time oil prices collapsed over the past ten years, a chorus of respected analysts quickly jumped on the low oil price bandwagon. By and large, these are the same people who also told the world that oil was likely to hit \$100 or even \$200 by 2000.

At the other end of the spectrum are a small group of petroleum scientists have been warning in increasingly louder voices that the days of cheap, easy to produce oil, are coming to an end. People like Colin Campbell and Jean Laherrere labor over reams of petroleum data in their retirement and produce tomes of thoughtful analysis that shows we need to begin planning for this day, as it would be a jarring event if the world were unprepared.

These warnings have created a lively and at times, somewhat vicious, response from many of the economists. Too often, the debate gets wrapped up in whether the world is running out of oil, or not. I have read quite carefully the detailed analysis on both sides of this debate. I can also unequivocally say that the scientists have far more detail to support their views and none have argued we are going to run out of oil.

The petro-scientists merely warn that oil supplies might soon peak and then begin a long, steady decline. This is a totally different problem than running out of oil. But, its impact on global economies would be catastrophic unless we prepare for it.

I recently completed a lengthy study on the world's Giant Oil Fields. I began this data search out of curiosity because I had not seen any report on the world's top ten or twenty (or even top 50) oilfields, in terms of what each field actually produces (as opposed to total reserves.)

When I finished my work, as imperfect as it is, because of the lack of good reported data, the conclusions were a big surprise.

Many people assume the world now has an ample, broadly diversified oil supply. In fact, it turns out that 14 giant oilfields produce 20% of the world's total supply. The average age of these genuine giant fields is 45 years. Several of the largest of these fields were discovered in the late 1920's or 1930's. Only three were discovered after 1969. None were found after 1976.

The world's population of oilfields producing over 200,000 barrels per day is now less than 60 out of over 4,000 individual oilfields. Another 60 fields produce just over 100,000 barrels per day each.

Only three fields found since 1980 still produce over 200,000 barrels per day. In the decade of the 1990's, over 420 officially named oilfields were discovered. Of these, only 11 produce over 100,000 barrels per day. The notion that the largest fields always seem to be found first certainly was the case over the last 50 years.

There is virtually no published field-by-field data for the majority of these giant oilfields. Just getting reasonable production estimates for these critically important fields took me months of digging around and global e-mails around the world. No accurate field-by-field production data means that few people have any idea which of these fields may now be in decline, let alone what the current decline rate might be, or even what they will become as they get progressively steeper.

The fact that it has been so long since many fields of considerable size have been found, despite the great technological revolution, argues that perhaps most or even all of the real giant oilfields were found over 40 to 70 years ago.

If the world has to begin replacing the declines from these giant fields with a proliferation of small fields which peak fast and then decline rapidly, we are setting up a treadmill that will not work without high oil prices and a steadily increasing armada of high technology rigs and people.

Could this treadmill race be run, let alone won? The answer is a resounding "yes!" as long as we have ample time and money to prepare for this endurance contest. But if we are unprepared because of the lack of good data, the odds are high that we will lose the race.

It is time to end the debate on whether the world is awash in oil and begin seriously studying the implications of what would happen to our energy mix if world oil production



finally peaks. It will happen some day when all these aging giant fields begin to decline. It is also high time for the oil industry and the governments profoundly impacted by oil, a list that includes both Canada and the USA, to take the issue of bad energy data seriously and begin an urgently needed reform. The time has come for every supply analyst to take the issue of decline curves seriously. They are not one-time events. They now dominate most important oil basins.

It is also time for the public policy people overseeing energy to examine whether energy trading with almost no margin requirement is the best way to price energy. Had energy trading been subject to the same margin requirements we strictly impose for trading stocks on the New York Stock Exchange, Enron would still be a small but thriving business today.

The time has also come to finally address the dangers inherent in the new volatility that now sends oil prices up and down by two or three fold. Is this really as good as all the market transparency experts have argued? In my opinion, this high volatility is not "business as usual" but potentially lethal to the energy industry's well being.

The fundamentals for oil are not vaguely as bad as the mood and price would indicate. We are setting ourselves up for suffering through one more "phony" collapse. The other two took a painful bite out of our oil industry. At what point will the powers that be in our energy world wake up to these dangers and reform our energy system? Can the system be reformed? Absolutely yes, as long as the industry participants resolve to get the system corrected.

Thank you for your attention to these serious energy issues.