

## OIL PRICE TRENDS THROUGH 2004 – 2010

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### Introduction

Recent headline data from the OECD's IEA and the US EIA on world production and regional inventory stockbuild, together with 'traditional' reports of apparent 'overproduction' by OPEC members beyond their December 2003 export quota targets are presented by some analysts as offering a prospect for oil prices sliding well below 26 Euro/barrel (33 USD/bbl), perhaps by early summer 2004. Optimism regarding nonOPEC supply growth is however muted at this time, with the only major upturn to counter nonOPEC production decline by its 3 largest OECD producers (USA, Norway, UK) coming in the shape of Baku-Turkey pipeline deliveries from Caspian region producers. Deliveries are slated to build to about 2.5 Million barrels/day (Mbd) through 2004. World demand remains strong, and particularly in the emerging industrial superpowers of China and India.

World oil stocks, using periodic data from the IEA, EIA and oil majors remain well below average figures for the 2000-2003 period, and combined with recent – extreme – figures from the IEA for world oil production (around 82 Mbd) clearly suggest there is no serious change to an underlying, tightly balanced context. The base for this situation is world demand. This has been consistently underestimated, now, for over 2 years, with the major oil importer country agencies (IEA and EIA) continuing to forecast slower demand growth being likely 'going forward', but not in the figures they publish for the present and real world! In fact, demand at the world level is growing faster than in the 1990s due to unstoppable growth of energy demand by key, large population, very fast growing economies including China, India, Brazil, Pakistan, Iran and Turkey. In addition, the USA (taking about 27% of world oil output) has shown consistent and large demand growth coming out of the 2001-02 recession in what is effectively a 'jobless recovery'. It is however in no way 'energy lean', reflecting technology, infrastructure, social and demographic changes.

Weather trends have become ever stronger, even key factors in deciding price movement – again reflecting the tightly balanced, low stock context due to world demand growth trends moving ever further away from the 'low growth paradigm' of the early 1990s, and moving up with higher oil prices that themselves lead to faster economic growth, and firmer oil demand at the world level. Another factor tending to drag oil prices higher is strong growth of natural gas demand in several world regions, while supply flattens and then shrinks. For the two largest gas consumer regions, USA and Europe, the fast emerging picture is one of serious shortfalls in regional and national gas supplies, becoming 'structural' pricing factors well before 2009. Gas prices in the USA will certainly never return to those in the 'Cheap Oil interval' of 1986-99, when daily traded prices averaged around USD 2/Million BTU (MBTU). The emerging gas price paradigm for US consumers is now in the USD 6 – 10/MBTU range, equivalent in energy economic terms to oil at around USD 35 – 58/barrel. Gas prices in Europe are 'traditionally' above US prices; faster decline of European gas production compared with US domestic output will for some while maintain or reinforce this differential. In turn, this will drive European oil prices to the same, or higher levels than those in the USA, negating market proximity-transport cost differentials that tend to reduce European oil prices relative to US prices. Gas at USD 10/MBTU results in oil at Euro 45/barrel becoming competitive, and these price levels will encourage day traders to erode any remaining negative price differentials against oil, effectively raising its price, in both markets.

### Oil prices and world economy growth

Since late summer 2003 and for about 4 months, US economic growth was likely running at close to its record postwar rate of about 7.5%, achieved for the whole-year period of 1984. At the time, expressed in dollars of 2003, year average oil prices were in the region of USD 52 – 65/barrel. The recent (late 2003) US economy growth figures provide a direct challenge for those who regularly claim that "High oil prices hurt economic growth". As in 1984, faster economic growth in 2003 was in no way hindered by higher oil prices, and *in fact* was likely accelerated by higher oil and energy prices spinning off higher raw material, agrocommodity and other 'real resource' prices, raising the purchasing power of generally low income exporter countries, and buoying world solvent demand. At the same time, the large, new and emerging industrial superpowers – especially China and India – have such generally low economy-wide energy intensity (around 1/8<sup>th</sup> to 1/15<sup>th</sup> per capita intensities of the USA and EU countries) that they are easily able to absorb much higher oil and energy prices.

Over the last 30 years, the oil price impact on world oil demand trends can be appreciated through comparing and contrasting year-peak oil prices in constant 2003 dollars, and year average demand, together with demand trends on a 3-year base. This is shown in the Table, below

Table (1) World per capita oil demand and oil price trends 1971-2003

Year	World population Year average Millions	Average daily oil demand Mbd 'all liquids'	Billion barrels consumed per year (Gby)	Change on previous 3- year value (percent)	World per capita average (bcy) Barrels/capita per year	Year peak oil price in 2003 dollars per barrel (light volume crudes)
1971	3750	51.76	18.89	+ 11.4%	5.03	USD 15 / bbl
1974	3980	59.39	21.68	+ 14.8 %	<b>5.44</b>	<b>USD 56 / bbl</b>
1977	4200	63.66	23.23	+ 7.2%	<b>5.53</b>	<b>USD 38 / bbl</b>
1980	4410	64.14	23.41	+ 0.7%	<b>5.31</b>	<b>USD 79 / bbl</b>
1983	4650	58.05	21.18	- 9.6%	<b>4.56</b>	<b>USD 59 / bbl</b>
1986	4890	61.76	22.54	+ 6.4%	4.60	USD 32 / bbl
1989	5150	65.88	24.04	+ 6.6%	4.67	USD 32 / bbl
1992	5400	66.95	24.43	+ 1.6%	4.52	USD 29 / bbl
1995	5610	69.88	25.51	+ 4.4%	4.55	USD 25 / bbl
1998	5870	72.92	26.62	+ 4.3%	4.53	USD 18 / bbl
2001	6130	75.99	27.74	+ 4.2%	4.52	USD 31 / bbl
2003- 2004	~ 6350	~ 78.5 – 81	~ 29 – 30	+ 4.9% (3- year base)	<b>~ 4.55</b>	<b>USD ~ 60 / bbl</b>

Population data/ UN Population Information Network (year average or « June » population estimate)

World daily average oil demand each year : BP Statistical Review of World Energy, various edns.

Peak annual oil price (3 month basis) for light volume crudes, world demand and price deflator forecasts for 2003-04 are by this author.

### High oil prices do *not* hurt economic growth

The often repeated but unproven claim that 'High oil prices hurt economic growth' is also lacking the proof of any logical corollary, i.e. that "Low oil prices favor economic growth". The fast fall in economic growth rates in all OECD countries following the 'liberation' of Kuwait in 1991, which most certainly helped Bill Clinton to massively defeat G. Bush-1 in the US presidential elections of 1991, was accompanied (or driven by) fast falling oil and energy prices. Before this non proof of lower oil prices 'aiding' economic growth, the very large oil price falls of 1985-86 did not lead to faster economic growth in any major OECD country through 1986-88.

Conversely, the 'Baghdad Bounce' so often predicted before the US and UK war on Iraq in 2003 was most certainly upward for oil prices. Economic growth rates, already at high levels in South and East Asia, tended to bounce yet further in these fast growing economies. In addition and for about 4 months in late 2003, even the sluggish and erratic US economy showed some signs of 'vintage' economic growth, before falling back to lower and more hesitant trend rates. At end 2003 and in the first two months of 2004 there is no sign, anyplace in the world, of fast falling economic growth rates, despite (or because of) oil prices in the USD 33 – 35/bbl range in the US market.

### Real world demand is anything but weak

According to recent data published by the IEA, world oil production in January 2004 was running at close to 82 Million barrels/day (Mbd). The very same IEA indicates in previous publications that average daily demand for 2002 was well below 76.5 Mbd (in the range of 76.1-76.4 Mbd). On that basis, but comparing a winter peak with a year-average number, growth of demand through the 24-month period of 2002-2003 is a vast and unbelievable 7 %. This underlines a central argument for oil prices continuing their upward trend since 1999: average 3-year

growth rate trends have held at around 4.5%, since the early 1990s, with per capita oil consumption staying flat at about 4.5 barrels/year since the early 1980s. This however is not a ‘fixed paradigm’, and can likely be *levered up* and in part by higher oil and energy prices.

A new paradigm, closer to average per capita rates of the ‘high oil price’ period (see above Table), is more than possible, and implies a sharp accentuation of persistent undersupply to a tightening world oil market. World per capita oil demand increased fastest through about 1968-78, in spite of the first Oil Shock quadrupling of crude oil prices. World oil demand growth since 2002 has surprised many analysts and observers, and not least the IEA, which has been forced to consistently revise up world and regional demand estimates. Going forward, three ‘new paradigms’ for annual average per capita demand can be posited, as shown in the Table, below. All of these paradigms lead only to one conclusion: sharply higher oil prices. In addition, these potential new trends rates of per capita demand and world demand growth on a 3-year base are *themselves* driven by a world economic context of faster economic growth arising from higher energy and real resource prices. Any remaining tendency for ‘loss of market share’ by OPEC members can only disappear with the type of vintage growth in world oil demand that may be underway. It is also noted that the per capita average demand figures used (4.75, 5 and 5.25 barrels/capita/year) are in no way ‘extraordinary’ numbers. In 1980, with oil prices briefly attaining USD 100/barrel in 2003 dollars, and a year-round peak value for a basket of lighter crudes attaining USD 79/bbl in dollars of 2003, world per capita consumption averaged about 5.3 barrels.

Table 2 **2010 world oil demand** for 2 population growth scenarios and 3 annual average per capita demand scenarios (‘Low’ and ‘High’ population growth: ‘Low’, ‘Medium’ and ‘High’ annual average per capita demand)

PER CAPITA AVERAGE DEMAND Barrels/year	WORLD POPULATION 2010 Millions (year average)		YEAR TOTAL DEMAND Billion barrels (Gby)		YEAR AVG DAILY DEMAND Mbd in 2010	GROWTH FROM 2001-02 Mbd growth (8 year minimum)
	HIGH	LOW	LOW	HIGH		
Low 4.75	6900	6800	32.3	32.8	88.5 - 89.8	~ 12.5 Mbd
Med 5	6900	6800	33.8	34.5	92.5 - 94.5	~ 17 Mbd
High 5.25	6900	6800	35.4	36.2	97 - 99.2	~ 21 Mbd

Population growth forecast for ‘Low’ projection assumes UN forecasts of slowed annual growth for the 2020-2030 period are attained by 2004-2010. ‘High’ population projection utilises current trend of world demographic growth (85 – 90 Million/year).

World average per capita oil demand figures: ‘High’ case does not exceed 1980 average (5.3 bcy)

### Emerging and ‘structural’ undersupply

There can be plenty of discussion as to what ‘structural’ undersupply would mean with world oil output likely to soon start trending down, from its peak that may be well below 90 – 92 Mbd (according to analysts such as the ASPO group and W Youngquist). The key word for analysing price-demand relationships and the much-predicted but slow emerging ‘Gas bridge to the future’ is *soon*. This paper sets out to suggest that under almost any circumstance, any hypothesis there will be a widening supply gap *driven in part by rising prices*. The above scenarios (Table 2) are very far from adventurous or unrealistic. Barring major catastrophe, the population projections for 2010 are likely to come about, leaving only the average per capita or *demographic demand* as the factor with most margin for error. Here, we can develop the supporting rationales for a likely *increase* in world average per capita demand, as summarised below

\* **Non implementation of Kyoto Treaty** – Other than the EU countries, Japan and Canada there is little (and declining) likelihood of ratification *and* implementation by major oil consumer and importer countries including the USA, China, India and other emerging industrial countries. In the countries of possible implementation, average per capita or ‘demographic’ oil demand is broadly in the range of 12 – 20 barrels/capita/year (bcy). Reductions of more than 10%-15% from these high levels are very unlikely within a period of less than 5 or 10 years from the date of implementation of Treaty

obligations (2008-12), without strong coercion, and therefore will have little or no impact on 2010 forecasts.

\* **Fast growth of oil demand by new industrial powers** – both gas and oil demand growth by China, India and other fast emerging industrial economies is in the range of 6% - 15%+ per year. Fast growing private car fleets and development of the consumer society in these countries can likely follow the pattern set through 1975-90 by the Asian Tigers, leading to tripled or quadrupled per capita oil consumption within 10-15 years. Current per capita oil demand in China and India is in the range of 1.3 – 1.6 bcy.

\* **Impact of higher oil prices** – as shown in Table 1, above, much higher oil prices in the period 1973-80 accompanied *fast growth* in per capita demand. The range of demographic demand rates used in Table 2, above (4.75, 5 and 5.25 bcy) are *all* below the actual figures for 1975-80. The only potential for actual *fall* of world oil demand (as in 1980-83) will be through utilisation of the interest rate ‘weapon’, that is intense economic recession triggered by massive rises in interest rates in OECD countries.

As shown in Table 2, the forecasts presented here indicate a *minimum increase* of about 12.5 Mbd for the 8-year period of 2002 through 2010. In fact, the higher cases, with 8-year demand growth above 14 Mbd, are probably more likely in the absence of self-induced and intense economic recession in the OECD countries though indiscriminate use of the interest rate ‘weapon’. This shifts the analysis to a review of previous *actual* growths of world oil output over 8-year periods.

### **Supply growth shortfall**

No previous 8-year period shown in Table 1 achieved a net growth in world oil supply of better than 12.5 Mbd (in 1971-80). During that period oil prices increased about 400% in nominal terms, briefly attaining an all-time peak of about USD 100/bbl (in 2003 dollars). Towards the end of the period (1978-83) world exploration-development activity achieved its highest-ever rate of spending and activity. Current trends for exploration-development are very far below this.

As noted several times, the relation between oil prices, world economic growth and per capita or ‘demographic’ oil demand is dynamic: with a return to prices comparable to those of the ‘high price period’ (broadly above \$55 per barrel in current dollars), per capita demand can easily re-attain more than 5 bcy. At 5 bcy world oil demand will quickly attain or exceed 89 Mbd, and even a return to low annual growth rates around 1.6% will generate an annual demand increment of about 1.6 Mbd.

Taking likely and reasonable net supply or ‘offer’ growth outturns over comparable 8-year periods, we find these have historically ranged around 8 – 9.5 Mbd, through the past 30-odd years. In other words, no previous recent 8-year period has achieved growth of net supply offer much better than about 60% of the approximate 14 Mbd growth of world demand that is forecast, here, for the near term period to 2010. The increment projected as a likely low-medium figure (14 Mbd in 8 years) represents at least 50% of OPEC’s real export capacity at this time, and well above 60% of 2010 export capacity for OPEC as presently constituted.

It is of course not necessary to indicate that – overall – the nonOPEC countries have relatively or absolutely small reserve bases and high production/reserve (P/R) rates, for example UK, Syria, USA and others, but *excluding* Russia, the only major nonOPEC producer with significant potentials for increasing its net export or ‘offer’ potential through 2010. Inside OPEC, only the 3 Middle East producers of Saudi Arabia, Kuwait and UAE have any major potential for increasing export offer above current levels, and in *volume* terms only Saudi Arabia is significant, relative to projected world demand growth. The non Middle East OPEC members, Nigeria, Venezuela, and Indonesia are likely unable to expand export offer through the period considered, and especially the last two countries. Iran, by the period 2010-12, may become a net importer of crude, like Indonesia.

The ‘bottom line’ to this is fast emerging supply shortfall to a backdrop of fast increasing dependence on Russia and Saudi Arabia – or – transition to lower energy, conservation and renewables oriented, economy and society restructuring strategies. Given the ‘laissez faire’ or New Economy doctrine in charge of most thinking in current leaderships of developed countries, this last outcome is for the least unlikely.

## Conclusions

Growth rates of world oil consumption (e.g. 3-year averages) started moving up since the 1994-96 period, and have received new impetus through a combination of higher oil and gas prices, and the very fast economic growth of China, India and other large population, fast industrialising countries. Current 'trend rates of growth' are likely about 2.25%-per-year, that is well above world population growth, indicating that per capita average demand *is increasing*. Oil price rises since 1998-1999, it should be stressed, have *not* reduced this trend, but in fact have bolstered and reinforced it.

Through a mix of factors, oil demand by the US economy – consuming about 27% of world oil production for 4.5% of world population – is showing sustained growth. In early 2003 this ran at about 2.9% annual; year-on-year trends will likely remain well above 1.75%. Only self-imposed recession through high interest rates would or will change this. While initially unrelated, fast rising US gas prices underlain by slow growth or fall in domestic gas production capacities, will likely exert a 'ratchet effect' on oil prices in US markets. In turn, this will affect oil prices outside the US. In Europe, traditionally high gas prices will set a floor to any short-term falls in oil prices due to increasingly erratic oil supply increments, which themselves are due to the world moving rapidly towards Peak Oil (maximum production rate the world can achieve).

China, India and certain other fast industrializing, large population economies may triple or quadruple per capita oil demand within 10 to 15 years, on a 'trends continued' base. In the case of the Asian Tigers and taking their period of fastest oil consumption growth (generally 1965-85), we find that South Korea and Taiwan, for example, achieved a growth of 1604% and 703% respectively, in their national oil consumption through 1965-78, using data from *BP Statistical Review*. In the case of China and India, today, their oil import demand growth will be considerably higher than their consumption growth due to falling domestic oil production. Annual growth rates of imported oil are typically at double-digit rates (for China about 27% in 2002-03). Consumption growth trends for natural gas in these markets is even stronger than for oil – Indian gas demand is likely to increase about 20% for 2003-04, with China's demand up by about 13.5%.

## Price transition before energy transition

Very large investments are needed if both OPEC and nonOPEC suppliers are to blunt the arrival of structural undersupply on world oil markets, which is likely imminent without much higher prices. These (higher prices) will both limit demand growth in the energy-saturated OECD countries, and enable financing of increasingly risky, higher cost exploration-development. Based on statements by Lee Raymond, and by John Thompson (notably in articles published by ExxonMobil in its journal 'The Lamp') spending in the oil sector, on a worldwide basis, may need to exceed 2500 Billion US dollars, at early 2003 purchasing power levels (or about 3000 Bn dollars at early 2004 parities), in the next 12 years. Enabling this quantum leap in exploration and development is likely *impossible* without much higher, and sustained prices, well above USD 45 or Euro 36 per barrel, and about USD 7.50 or Euro 6/MBTU for natural gas.

These pricing levels, it can be noted, were surpassed in constant dollar and purchasing power terms through 1975-78, in which OECD country economic growth rates, and oil demand growth rates averaged about 3.75%-4% annual. At the time oil prices expressed in 2003 dollars were about \$38-\$55/barrel. Suggesting a price level similar to that of more than 25 years ago is difficult to call 'radical'. Unfortunately, the subject of oil prices is given benign neglect when they fall, and energetic propaganda treatment, now with assorted military adventures, when they rise. Most politicians and economic policy makers believe in a simple slogan: the lowest price is always the best.

Moving up to new price bands can be the focus of serious and committed international attention to the risks facing all players at this time. Runaway price rises in a free-for-all bidding process following supply loss of no more than 5% is the worst possible scenario. Underlying all this is the basic need for higher and less volatile oil and energy prices, accompanying serious and committed energy conservation, transition to renewable energy and restructuring for a low energy economy, habitat and society. These are the real long-term solutions to emerging supply difficulties which will surely raise prices. However, and at present energy transition is discarded as utopian and unworkable by the current crop of political decision makers.