

PRICE SIGNALS OR CHEAP OIL NOISE?

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Oil prices and economic growth

The US economy attained its highest-ever postwar growth of real GDP, achieving what today would be the unthinkable and impossible rate of 7.5%, in the Reagan re-election year of 1984. At the time, in dollars of 2003 corrected for inflation and purchasing power parity, the oil price range for daily traded volume crudes was \$57-\$65/barrel. Despite this simple fact of economic history, Cheap Oil is still regarded by uninformed, sectarian opinion as a passport to economic growth.

Media and political comment would have us believe that *regime change* in the Mid East, initially in Iraq, will in time 'free up' and produce abundant supplies, but for the moment there is little avail and remedy on the supply side to immediately force down oil prices. Higher and much less volatile oil and energy prices underlying serious and committed energy conservation, transition to renewable energy and restructuring for a low energy economy, habitat and society are the real long-term solutions but these are discarded or rejected as utopian and unworkable by political decision makers. While claims are ritually made of today's economy being 'less oil dependent than in the 1970s' actual oil consumption, and oil import dependence as a percentage of consumption in a large number of OECD economies has risen by 25% to 50% since 1990 and continues to rise. Oil prices, given benign neglect when they fall, and energetic propaganda treatment when they rise have only one 'bottom line' in economic policy: the lowest price is always the best.

In theory the 'price signal' of higher oil and energy prices must be present if a range of goals stretching from reduced greenhouse gas emissions through energy independence to slowing the rate of fossil energy resource depletion are regarded seriously. If they are not, or they are denied as being of any importance this well explains the basic unpreparedness of large oil and gas consumer countries to accept higher and more stable oil prices. Any large interruption in supplies, of more than 5% or so for under 6 months, or depletion linked failure of world production capacity to match demand and its growth would, as in the past, create an immediate crisis.

This leaves 'demand destruction' as the sole option and real response to any large rise in oil or gas prices, through economy destruction by *the interest rate weapon*. The last time this was done, in 1980-83, oil prices were surely reduced through cutting economic activity in general. Oil prices in today's dollars fell from \$100/barrel in late 1979 to around \$60/barrel in 1984, but the collateral economic and social damage was awesome. Unlike today, however, the OECD economy started from a position of growth, with balanced budgets in many countries including the USA, in 1979-80. The world economy could and did take the horse medicine of sky-high interest rates without

imploding into a sequence like that of 1929-31, but there is no certainty or guarantee this would be the case today – no ‘soft landing’ is currently on offer.

Oil prices as high as \$60/barrel would not harm the world economy, in fact they would entrain increased growth at the ‘composite’ world economy level within a few months, but extreme interest rates, today, would result in massive economic damage. There would be certain collapse of world stock markets, runaway ‘domino effect’ bankruptcy of many major finance sector corporations, mass layoffs and unemployment, and grave problems for financing the *structural* trade deficits of especially the US and UK. The US, also facing an all-time record deficit of its public finances (\$455 Bn in 2003) and around \$4 Bn per month costs from its ‘regime changing’ experiment in Iraq would expose itself to the risk of runaway flight from the dollar as the interest rate weapon produced stock market and economic rout in its wake. The declining *petromoney* status of the GB pound would unlikely shield the UK economy from the sequels of *the interest rate weapon* being used as a blunt tool of energy policy, to force down oil demand. All European Union countries, and Japan would also face severe national budget financing difficulties, as tax revenues collapsed and spending to limit economic damage, including unemployment compensation and bailouts for large companies spiraled up as the crisis deepened. Financing increased state spending through borrowing would then *lock on* the upward spiral in interest rates, and itself intensify recession while maintaining inflationary pressures.

Why oil prices can only increase

For a number of reasons oil prices are on an erratic but upward trend since their 1998/99 most recent low of around \$10/barrel. The most recent ‘price shock’ sequence can be described from various perspectives, including the following/

“It is useful to distinguish short-term price fluctuations from episodic movements that sometime characterise certain longer periods of time. The most dramatic episode occurred fairly recently and is still very alive in people's minds: this is the 1998/ early 1999 price collapse followed by rises which took prices to high levels throughout 2000. The WTI price (NYMEX first month futures contract) was at \$17.65 per barrel at the beginning of January 1998. It reached a low of \$10.80 in late December 1998, but the lowest levels were not hit until early February 1999 when WTI bottomed at \$10.26 and Brent at \$9.70. After that date the price movement was relentlessly upward with the WTI price ending the year at around \$26.50 per barrel and peaking at \$34.15 on 7 March 2000. It took 13 months of toil for the market to bring the price down by slightly less than \$7.0 (that is by 39%) and then another 13 months of over-excitement to raise it by almost \$24.0 (that is by 233%)”. ‘Does Oil Price Volatility Matter?’, Robert Mabro, Oxford Energy - OIES Monthly Comment, June 2001

Amusingly enough Mabro and other commentators who characterise price increases as ‘over-excitement’, and price falls as ‘toil for the market’, trace the signal for this upward price movement to a late-1997 decision by OPEC to *raise* output quotas by 10%. This in turn isolates a key element of oil market mythology – the fixed belief that OPEC has always got spare capacity, and will always have spare capacity. For OPEC as

currently constituted (including Iraq), and for the next 3 – 5 years no sane analyst can go above 31 – 32 Million barrels/day (Mbd) of exportable capacity, over and above domestic economy oil consumption needs. Speculation on this export capacity number is of course a prime subject of ‘OPEC watching’, but many unbiased observers suggest the real maximum export capacity of OPEC today, and for the next 3 – 5 years will have real difficulty exceeding 28 – 30 Mbd. More important, and with very few but key exceptions, exportable surpluses of current OPEC producers can only stagnate or diminish. The ‘key exceptions’ of course include Saudi Arabia and Iraq (with perhaps Abu Dhabi, Kuwait and possibly Nigeria) in the OPEC group, and essentially the Russian Federation alone in the nonOPEC group of oil producers with large exportable surpluses that can, could or might be increased.

Oil market price setting as Mabro and other commentators point out is through trading *expectations*, not facts. These expectations, in other words market mythology has it that there can only be slow, gradual and predictable rises in world oil demand, with supply from OPEC and nonOPEC ‘players’ always tending to increase above market demand. By consequence, prices ‘spike’ from time to time, when demand very temporarily outstrips supply, but always return to very opaquely defined ‘normal trading levels’. For about 13 years through 1986-99 these were set at ‘around \$18-per-barrel’. Quite how this price was first arrived at and then fixed is at least as opaque and mysterious as oil prices attaining \$100/barrel in dollars of 2003 during the Iranian Revolution, in 1979-80, but may relate to very cheap natural gas prices, operating a downward ratchet effect on oil prices. Cheap oil price theory embodied in the *lucubrations* of M A Adelman - that the ‘right price’ for oil is \$2.50-per-barrel in dollars of 1972 – has like Gresham’s Law fully displaced any consideration of why prices should rise, on the theory side. For a few weeks in late 1998/early 1999 the ‘right price’ of Adelman was achieved, when prices in current dollars hovered around \$10/bbl.

We can suggest this supply-led, market mythologized pricing process that is defended by its admirers as ‘real world application of Say’s Law’ is certainly no better than fixed or ‘fiat’ oil exporter price setting as used before 1987, and has not so many more glorious days of trading before it. In support of this, opening a chasm in cheap oil and cheap energy mythology we can note the special case of US natural gas market since late 2002. The US gas market and its price setting context is now exposed to a wealth of disinformation seeking to hide the essential *fact* of depletion, the simple fact that the US is ‘drilled out’ and is a harbinger and outrider for a depletion triggered shift to deficit overhangs on natural gas markets in Europe, and the world. Where gas pipelines cannot be constructed – through cost, geopolitical or time constraints - supply to compensate localized depletion will have increasingly to switch to LNG from exotic locations. Prices for this *lifeline gas* will also be exotic relative to \$2/million BTU for gas and the \$18-per-barrel oil that, in economic mythology, underpinned or perhaps flowed from the ‘economic success’ epitomized by the Clinton Boom of 1992-2000. None other than the absolute defender of *free market pricing*, Alan Greenspan, has let it be known that US natural gas prices may attain \$7/million BTU, equivalent to \$41-per-barrel oil, this winter. Greenspan of course did not add the simple fact that overcheap gas for too many years inevitably ‘over downsized’ gas exploration, proving and development effort, while encouraging consumers, including almost all new electric power producers in the US and many other countries to use cheap gas without a thought for tomorrow.

Demand shock

The BP Amoco Statistical Review of World Energy in its 2003 edition notes the ‘surprising growth’ of world energy demand since 2001 and 2002 – about 2.6% annual compared with a so-called “10-year trend rate of 1.4% annual” . Within this trend, and according to BP Amoco, the OECD IEA and other energy sector institutions, world oil demand’s trend or underlying average growth rate would be about 1.3% per year. This ‘10-year trend’, for oil, gas and latterly coal was in fact already giving way to higher yearly growth rates by about 1995, and has little or nothing to do with oil prices.

By comparison and during the 1975-79 period, with oil prices in today’s dollars in the \$38-\$55/bbl range, world oil demand growth easily averaged 4% annual by volume. Current demand growth rates in the Asia-Pacific region, since 1992 second only to North America as an oil importer and consumer, are generally in the 4%-6% annual range for many regional countries including China and India. It is therefore easy to suggest the “10-year trend” of 1.4% for commercial energy, and about 1.3% annual for oil was an aberration. In addition, if oil prices played any role at all in setting this low growth trend, it was through *cheap* oil and gas in the 1986-99 period. The main determinant of low demand growth was continually falling rates of economic growth in the OECD countries. Since at latest 1995-1997 this low growth trend has given way to higher annual growth rates, for a large number of reasons notably including faster industrial growth outside the OECD bloc.

This in turn underlines exactly why, in late 1997 and through 1998 it suddenly became rather important for OPEC suppliers, usually enmeshed in a losing battle of oversupplying a relatively ‘stagnant’ market (again in market cosmology but not in fact), to vigorously increase supply. The 10% increase decided at the December 1997 Jakarta meeting was – several months later – saluted by a tripling of prices, after a ‘ritual’ price crash. The real world fact of this change in oil market mythology – the market no longer being ‘structurally oversupplied’ - is that *demand shock* had started to act well before 1997. This can be appreciated by comparing annual increases of world demand through 1995-99 with increases through 1990-94.

World oil demand change by volume, % change on year before

1995	1996	1997	1998	1999
1.64%	2.15%	2.61%	0.52%	2.86%
1990	1991	1992	1993	1994
1.31%	- 0.19%	0.51%	- 0.04%	2.09%

Source/ BP Amoco Statistical Review of World Energy, various editions

The almost complete lack of ‘price elasticity’ relations between oil prices, and world oil demand can be appreciated from the fact that almost each time oil prices tended to rise *demand increased* within about 6-12 months. This is particularly flagrant for 1999 compared with 1998: after an approximate tripling in terms of peak-trough year prices world oil demand *increased* at its highest rate in nearly a decade! Whenever prices fell during the 1990-99 period, demand growth rates tended to fall. This again proves, if proof is needed, that world oil demand is dependent on global economy growth and yearly changes in that growth, and is usually unrelated and un-linked to the oil price except when very, very high prices are attained in a very short period of time. Over the short-term, and depending on prices attained, demand often *increases* as prices rise.

This above can be better appreciated when annual price variations for major volume traded crudes are expressed in constant 2003 US dollars, as shown below:

World oil demand and oil price variations 1990-99

Year	1990	1991	1992	1993	1994
Year min oil price 2003 \$/bbl*	20.75 USD/bbl	21.60 USD/bbl	21.50 USD/bbl	17.05 USD/bbl	16.90 USD/bbl
Year max oil price 2003 \$/bbl*	39.40 USD/bbl	34.55 USD/bbl	29.60 USD/bbl	26.65 USD/bbl	24.65 USD/bbl
Demand change % on year before	+ 1.31%	- 0.19%	+0.51%	- 0.04%	+2.09%

Year	1995	1996	1997	1998	1999
Year min oil price 2003 \$/bbl*	19.55 USD/bbl	21.05 USD/bbl	20.55 USD/bbl	10.95 USD/bbl	27.70 USD/bbl
Year max oil price 2003 \$/bbl*	25.20 USD/bbl	29.55 USD/bbl	28.15 USD/bbl	18.75 USD/bbl	28.95 USD/bbl
Demand change % on year before	+ 1.64%	+2.15%	+2.61%	+0.52%	+2.86%

Sources/ World oil demand volume change – BP Amoco Statistical Review, various editions

* Oil prices – Volume crude monthly averages in current dollars from Platts Oilgram, OPEC Bulletin

Dollar purchasing power adjustment – California Energy Commission deflator as used in Delphi Series of oil price forecasting models

World potential demand is almost unlimited

Insofar as *potential demand* is concerned, any supplier (whether OPEC or not) should be joyful, or very concerned for their forward national security when serious analysis is given to real world oil demand structures and growth drivers. These are all, finally, due to demographic and economic growth, to conventional technology used in the economic process, and to the very slow progress in finding real, economic, and effective substitutes for oil, gas or even coal.

Oil remains the economic 'swing fuel' par excellence, and oil price increases – up to certain supposedly 'extreme' levels - always tend to increase or restore economic growth at the world or 'composite' level. In addition *oil shock* or sudden and large price increases, or slower acting but large price rises that 'stick' also change the *type* of growth towards more energy-intense industrial and manufactured products, away from more services based, lower energy activities. This 'perverse' factor itself increases oil intensity of world economic output and raises the 'oil coefficient' or percentage increase in oil demand for a percentage point growth of the economy. This *macroeconomic* change can affect all economies, some faster than others, during a certain time period. Wholly unlike the stock of myths, and 'facts' without foundation that circulate inside the oil market trading community these effects can be measured and have predictive value. In brief, a regime of higher oil and energy prices will tend to lever up world composite or global economic growth rates. This, in turn, produces the 'perverse result' of firm demand for much more costly oil and gas.

Oil demand drive elements – 'demographic' demand

Current oil demand worldwide extends down from 25.6 barrels/capita/year (bpy) for the USA to well below 0.2 bpy in rural areas of low income developing countries (LDCs). The world average, which fell slowly for around 15 years through 1978-93, is about 4.5 bpy. As a pure projection, if the world's current 6.3 Bn population consumed oil at current US per capita rates this would generate a demand of around 445 Million barrels/day (Mbd). At the other extreme, at 0.2 bpy world total oil demand would be telescoped to less than 3.5 Mbd. The current, real world average of 4.5 bpy is around one-third the average for European Union countries, and more than 4 times that of India, and over 3 times that of China – which will soon become the world's biggest industrial economy. Annual increase of the world's population (which is continuing to fall as a percentage rate, and in absolute numbers) is now running at about 85 Million. At the world average of 4.5 bpy this itself generates a 'latent' or potential growth in world oil demand of about 1.06 Mbd annual, assuming no change in the energy economy, no fuel substitution, and also no economic growth.

Demographic rate of oil demand, 2002

Country/Region	bpy	World demand at this rate
USA	25.6	445 Mbd
Italy	12.4	215 Mbd
China	1.45	25 Mbd
Rural areas, LDCs	0.2	3.45 Mbd

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Real world	4.5	78 Mbd

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World annual population growth 85 Million		Annual 'latent demand' increase 1.06 Mbd

Sources/ Population data from UN Population Information Network, Oil demand BP Amoco Stat Review

The following points are highly significant:

1 – If world average oil demand per capita in 2003 was the same as in 1980 (about 5.28 bpy with oil prices, in today's dollars at up to \$100/barrel), world oil demand today would be at least *12.5 Mbd higher* than it is. World demand in 2003 would run at an average of about 91 Mbd. There is no certainty at all that world supply would or could satisfy this demand.

2 – If we take current average annual world consumption (4.51 bpy) the 'demographic demand growth rate' of 1.06 Mbd per year is likely an incompressible minimum, except in the event of very severe global economic recession with actual contraction of world oil demand. Given annual loss of capacity from depletion at a minimum of 1.25 Mbd, the total new capacity or increase of production by existing fields needed each year is at least 2.31 Mbd, assuming virtual 'zero economy change-zero growth' as being a viable and sustainable situation.

3 – Any sustained growth in the world economy, that is recovery from recession in the OECD bloc, and/or continued fast economic growth in China, India, Brazil, Pakistan, Iran, Turkey and other large population 'emerging' New Industrial Countries (NICs), will significantly increase total annual world oil demand growth to far above 1.06 Mbd, perhaps to its double (about 2.1 Mbd). The current trend rate of growth is at least 2.25% annual (about 1.75 Mbd additional demand in 2003).

4 – Given that world oil demand has increased about 12 Mbd since 1991 it is wholly unrealistic to imagine that cumulative growth will be any *less* than this in the next 12 years, except if there is worldwide economic recession, or coordinated, legislative-backed world action for energy transition.

Cheap Oil, the depletion issue and firming demand

Any reasonably unbiased reader of the Oil & Gas Journal's current (2003) series treating "the depletion issue" could quickly conclude that oil and gas depletion, as ever, is a 40-year threat, challenge or opportunity, and therefore a subject for the Keynesian long-term. Extremely large remaining and recoverable oil resources, would exist in so-far underexplored or even 'ignored' regions like the deep offshore South Atlantic region, in parts of Russia that for various reasons would have been overlooked, and of course in Iraq, of which the 'real reserves' can be almost any figure above 200 Bn barrels that the 'expert' cares to toss up. World total endowment would, according to these optimists, be at least 4000 Bn barrels, of which production to date is about 900 Bn barrels.

Much less is said about the 'producibility' of these enormous reserves, that is the *rate* at which world annual oil production can be increased before some 'hypothetical' maximum is attained, of perhaps 150 Mbd by about 2038 (a 2% annual average growth rate for 34 years would bring world oil demand to 156 Mbd). Even less is said about *oil prices*. For the moment, most contributors to the Oil & Gas Journal's "depletion" series appear to suggest, oil market traders will pursue the 'toil' of talking down oil prices because supply tends to outstrip demand and cheap oil is so good for the economy. A host of 'expert' opinion will always be on tap to opine this is so, latterly using the approximate tripling of oil prices in 1998-1999 as a very retrospective explanation for the 2000-2002 'dotcom-telecom' equity price crash on world stock markets.

The OECD IEA in its monthly oil market assessment 'Oil Market Report' for 11 July 2003 is constrained, by facts, to record that world oil demand on an 'all liquids' base is running at an average of at least 78 Mbd in 2003. Based on data in previous issues of the same 'Oil Market Report' this yields a yearly growth rate of at least 2.25% for Summer 2003 against Summer 2002. Not only is no explanation offered for what BP Amoco calls "surprising growth" in the Introduction to the 2003 issue of its Statistical Review of World Energy, but the IEA confidently forecasts that world oil demand will only grow by 1.3% in 2003-2004, attaining 79.08 Mbd as the rate of average demand by Summer 2004. No explanation at all is offered as to why world oil demand growth will now suddenly return to the "long-term trend" growth rate, after its 'surprising' near doubling ! The IEA, in its July 2003 report then goes on to offer the perspective of nonOPEC suppliers increasing their market offer by up to 1.7 Mbd in the next 12 months, leading to OPEC suppliers losing market share for a fifth successive year. The only explanation offered for the Baghdad Bounce in world oil prices is that OPEC has decided not to increase output, and that Iraq's oil output is only making a "slow return" towards prewar levels. The now dramatic decline of North Sea oil production, with the UK and Norway losing a total of 0.516 Mbd capacity through June 2002-June 2003, and continuing gradual loss of US production capacity (a decline of 0.285 Mbd in the same period), while US oil demand increased at a 10-year record rate of more than 0.5 Mbd, are of course not mentioned by the IEA as factors raising prices.

The work of Deffeyes, Youngquist and the ASPO group on real world oil production potentials strongly suggests net additions to world production capacity will soon fall to

zero as the world arrives at its absolute peak of production. This will, through the deforming lens of the oil market, be tested in real time and its impact will be vastly increased price volatility, followed by price explosion. After this, depending on the immediate economic sequels, some form of world compact to hold oil prices in a new and much higher price band will possibly or probably be arrived at through hastily arranged 'North/South' conferences like those of the 1974-81 period.

No easy alternatives

Some economists argue the highest-ever one-year growth of the US economy in 1984 was due to equally extreme budget deficits operated by the Reagan administration with the aim of securing Reagan's re-election. The current Bush administration now seeks re-election of its leader, and is pouring on deficit financed spending but this has done little or nothing to restore or redynamise economic growth. The very recent growth upturn in the US economy, perhaps ironically, is attributed by analysts to stationing about 140 000 troops for occupying Iraq, that is very classical, labour intensive, military Keynesianism. Not coincidentally, the oil demand of foreign troops occupying Iraq is estimated at about 0.35 Mbd, effectively raising internal or domestic demand and constraining exportable surpluses by Iraq.

In real terms oil prices are still comfortably 60% below their level of 19 years ago. Real limiting factors on faster economic growth in most OECD countries do not include higher priced oil and gas, and do include the sequels of a long period in which economic growth has declined on a regular base, high levels of personal debt, fears of job losses, terrorism, climate change and other worries in what are essentially *consumption saturated* economies. There are ever fewer possible strategies for restoring conventional economic growth. Lower interest rates at this time, and apart from symbolic playacting with quarter-point cuts, can be discarded as any kind of rational, or even possible strategy for the simple reason that US, European and Japanese base rates are at *historic lows*. Most OECD countries, in 2003, have their lowest, or close to their lowest nominal (but not real) interest rates for 50 years! Further cuts in US interest rates, to base rates of *zero percent per year*, as suggested by Federal Reserve governor Ben Bernanke, would most surely increase the slow but certain movement away from the dollar. In crisis conditions, for example after stock exchange collapse, this perhaps could turn into classic *flight*. Gold prices could move up to extreme levels, oil prices in USD would likely grow strongly, but the only sure economic results for the USA would be sharply higher US inflation, and sharply lower US economic growth. Only restored economic growth in the US economy, in final analysis, can underpin the US dollar.

Higher oil prices restore world economic growth

Higher oil prices operate to stimulate first the world economy, outside the OECD countries, and then lead to increased growth inside the OECD. This is through the income or *revenue* effect on oil exporter countries, and then on metals, minerals and agrocommodity exporter countries, most of them Low Income (GNP per capita below

\$400/year). Almost all such countries have very high marginal propensity to consume. That is any increase in revenues, due to prices of their export products increasing in line with the oil price, is very rapidly spent, on purchasing manufactured goods and services of all kinds. In the 1973-81 period, in which oil price rises before inflation were of 405%, the New Industrial Countries of that period – notably Taiwan, South Korea and Singapore – experienced very large and rapid increases in demand for their exports. These three countries increased their oil imports in under 8 years through the 1973-81 period, and despite the 405% price rise, by 60% to 80% in volume terms.

This macroeconomic mechanism of higher revenues for fast spending poorer countries quickly levering up world economic growth (the very simplest type of Keynesianism, but at the global level) is easily triggered by rising oil and real resource prices, and flatly contradicts the arguments by authorized 'experts' who opine that higher oil prices 'hurt poorer countries the most'. Higher revenue earnings for many low income oil exporter countries, and also for the special case of Saudi Arabia may be the only short-term way to stop these countries falling into civil strife, insurrection or ethnic war.

No immediate and instant recession can occur with oil at \$50 or \$60 per barrel. Vastly higher oil prices than that would be needed to abort the worldwide mechanism of higher oil, energy and real resource prices driving faster economic growth. Conversely, low oil and energy prices entraining low real resources prices, combined with rising population numbers surely aggravate the 'cycle of poverty' in low income commodity exporter countries. Deprived of sufficient revenues, such countries have become 'basket case' indebted countries, subjected to draconian conditions by the Club of Paris, World Bank and IMF for debt refinancing and restructuring. Constant ethnic and civil war in Africa provides the best and most real example of what happens to countries subjected to so called 'structural adjustment'. When or if this concerns oil exporter countries there can be no surprise if this reduces or eliminates exports by the affected countries which, after the 'price taker' stage fall into the bottomless pit of basket case low performer economies. When they fall from that into civil and ethnic war their capacity to supply oil also takes a hit.

Today's New Industrial countries (NICs) include China, India, Pakistan and Brazil. All have either big or immense internal or domestic markets, and large potentials for *military Keynesian* spending, that is safeguarding national economic growth through deficit financed and labor intensive modernization and expansion of their military systems. The relative lack of integration of these *behemoth economies* in the world system, particularly India and Pakistan, also provides them with some cover or shelter from the effects of world recession, when or if the OECD countries tilt to all-out recession. Conversely, whenever any increase in world solvent demand for manufactured goods occurs, these countries will rapidly increase output. China is now and without question the world's leading industrial power for medium- and low-value consumer manufactured goods and will soon become the world's single biggest industrial economy. Under almost any hypothesis, therefore, fossil energy demand – particularly oil – will increase in China and India, and in the other large population NICs. Demand growth can only run at rates close to, or above their rate of economic growth.

Demand pull, supply pinch and oil price feedback

The absolute peak of world production may perhaps be no more than 84-87 Mbd on an all liquids base, and very far indeed from US EIA and OECD IEA prognostications of up to “115 Mbd by 2020”. Maximum net production increase, after replacement of production capacity lost through depletion impacts, through the 2003-2010 period, may not be able to exceed an annual average above 1 - 1.25 Mbd. Current world demand is on an underlying growth track of about 2.25% annual, or around 1.75 Mbd increase for the next 12 months.

This situation, logically, should entrain very large or nearly unlimited increases of oil prices within a period of no more than 2 – 3 years. Whether there is *military adventure* in Iraq, or elsewhere, this will have little real impact on emerging and structural *supply deficit* on world oil markets. The role of, and scope for utilisation of ‘strategic’ petroleum reserves (SPR) will become also tend to become ever more symbolic since the constitution of these reserves always *increases total demand* and, after utilisation, the reserve must be restocked with oil at a cheaper daily market price. If price have moved higher, the additional world demand due to SPR building or restocking will *increase* demand pressure on prices. At the present time not only the US, but also China and India are constituting or increasing their SPR with inevitable, additional impacts on world demand. The military occupation of Iraq, we can note, is estimated to need about 0.35 Mbd for the support of troops and logistics, thus sharply increasing total domestic oil needs of Iraq.

Large oil price increases can likely result in significant falls in OECD demand, within periods extending from 3 – 6 months but this is not at all the case in nonOECD economies. Taking current world regional per capita oil consumption rates, and economic output per barrel or barrel equivalent of commercial energy, the effectively *price elastic* OECD North, and *price inelastic* NICs and LICs present almost totally different ‘profiles’ under oil shock conditions.

The bottom line is that relatively large and rapid falls in oil demand in the OECD North, and sustained demand increase by NICs and LICs can be expected whenever oil prices break through the current, artificially low range of no more than \$30-\$35/bbl in 2003 dollars. On a composite base, and depending on exactly how far oil prices rise, net world demand can likely *increase* when or if oil prices rise to levels extending up to \$60-per-barrel or perhaps more.

Conclusions

For various economic doctrinal and economic mythical ‘reasons’ Cheap Oil is seen by the decisionmaking elite in the richer nations as the ‘passport to economic growth’. This is a pure fantasy.

Since about 1995 ‘demand shock’ has begun to operate in the world economy for a number of reasons, leading to considerably higher underlying growth rates of world oil demand.

Cheap oil and energy underpin the service oriented 'globalized' economy which drives the urban-industrial reference format, model and framework for economic development and social progress anyplace in the world. This in turn is a powerful motor for continued and strong demand growth for fossil energy, worldwide. Upward potential for personal consumption of fossil fuels is essentially unlimited in this context.

Physical depletion is either rejected or ignored as a price setting factor for oil and gas. Concerning oil there is mounting evidence that net additional production capacity is decreasing every year and may soon fall below the product of new capacity demand + annual lost capacity. By 2008 the world oil market may enter a situation of structural supply deficit. Before that period demand growth, and loss of capacity through accidents, stoppages or sabotage may produce recurring price 'spikes'.

In the case of conventional or classic economic growth, this will be enabled and facilitated at the world or 'composite' level by rising oil prices up to high price levels, probably above \$60/barrel in today's dollars.

Also because of depletion, but in addition because of environment and climate limits, energy transition away from fossil fuels must and will happen. Price signals, in the existing economic system and framework, are needed if this is to start, and to build from the immediate near term. Existing and developing frameworks provide by the Kyoto Treaty offer some potential for adaptation and direction to the task and goals of energy transition.