

## Supply, Demand, Depletion, Depletion, Depletion . . .

In January we look back at “energy events” of the past year, as we review our investment strategies going forward. This past December we celebrated our fifth anniversary as an investment management firm focused exclusively on energy, and feel compelled to lengthen the look-back this year to January 1999. At the time we brought together our skill sets of an energy investment banker and a macro top-down money manager in December of 1998 to begin our venture, oil and gas closed that year at **\$11.70** per barrel and **\$1.85** MCF/gas. With the exuberance surrounding the TNT sectors going into 1999, and the **ECONOMIST** front page exposé predicting **\$5** oil, many of our colleagues and friends thought we were nuts! Perhaps we were; however, virtually all of the macro views we held and espoused at that time regarding the developing tight relationship between supply and demand of crude oil and natural gas have been borne out, and have evolved into the rising energy super cycle thesis we refer to as the incoming **Tide**. However, our 60 years of combined experiences in the energy sector teach us to expect plenty of volatility on this rising **Tide**. Herein, we will review some of the energy issues that will continue to contribute to the volatility **Waves** on the **Tide** that must be managed by prudent energy investors.

### 2004 – CURRENT ENERGY ISSUES

As we exited 2003, oil closed at **\$32.50** and gas at **\$6.19** (a far cry from 1998’s \$11.70 and \$1.85, respectively). As we begin moving into the heart of winter and the 2003/04 heating season, oil resides somewhat over the top end of the OPEC \$22-\$28 price target range, and natural gas sells above \$5 per MCF, at a moderate premium to resid. In our **“But For”** research piece last January, we laid out the reasons why the oil price bears (who were projecting \$18 oil) were likely to be wrong in 2003. Through this piece we will examine the intricate dance between seasonal energy patterns, current inventory circumstances, the drivers of demand and supply, data question marks, and commodity pricing to provide an update on the rising energy **Tide**. What falls out of this analysis is a clear picture of where we differ from the energy price bears: our focus on depletion, and our distrust of the IEA data.

#### SEASONAL DEMAND

Seasonally, oil and gas demand is highest in the winter heating season, drops to a trough in April/May, has a secondary, lower, peak in July/August during peak air conditioning and vacation driving seasons, and a second trough in the early fall. The inventories of energy commodities have a cycle pattern that is the result of relatively steady production interacting with those seasonal swings in usage. Shifts in the actual inventory path relative to its normal seasonal swings are the result of supply or demand surprises. Currently, oil inventories are very low, while natural gas managed to recover this summer from extremely low levels to normal. We would argue the current low level of oil inventories has a great deal of information content that we will tie in to our conclusions later.

#### DEPLETION, DEPLETION, DEPLETION. . .

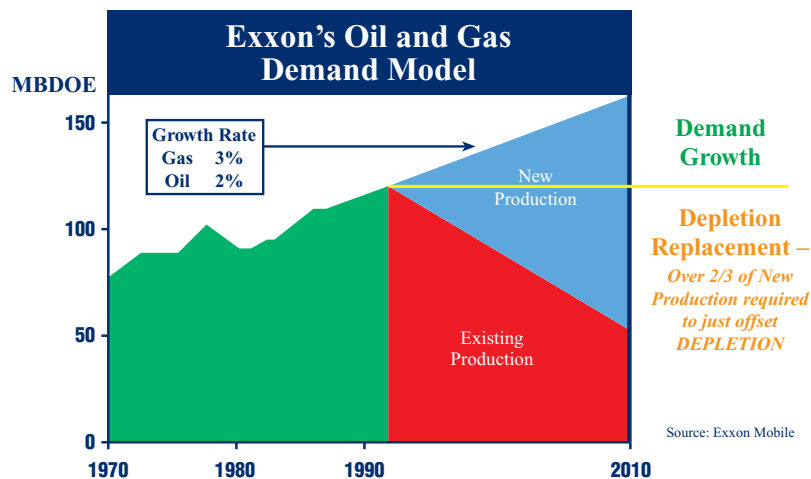
Most of the recent discourse over likely oil price movements has focused on growth of supply from the former Soviet Union (FSU), Iraqi rebuilding, and west coast of Africa. Longer-term analysis looks at Caspian developments, (Kashagan, e.g.), and other new supply. Rarely do we hear anything about the other side of the coin, depletion. The greater reality is that much of the new supply is needed to offset declines in other places. The table right shows how fast production falls in the absence of new supply from development drilling or new exploration.

Depletion Evidence	
Alaska North Slope	-18%
Large Oil Companies	-15% to -20%/YR.
Venezuela	-20%/YR.
North Sea Old Giants	-15%/YR.
Gulf of Mexico Oil	-25%/YR.

Source: Simmons & Company, PDVSA, Saga Petroleum, U.S. Minerals Management Services

Over a period of years this depletion makes a huge difference. Our estimate is that current world depletion is about 5%. That is, about 4 million barrels per day (B/D) of new production is needed this year, just to keep production flat. Exxon has a long-term model that uses a slightly milder decline rate, and which has oil and gas demand growth in line with our analysis. That model is pictured right.

As you can see, **two-thirds** of new supply is needed to **just** offset depletion, even at their conservative estimate. Only one-third is available to supply the growth in demand. We point all this out because it becomes very important if growth in demand does maintain its 2% growth trend. That implies about 7% of new oil production must be put in place each year to avoid a crisis. That is a lot of oil. Oddly, IEA and others are reluctant to factor in such an oil demand outcome.



## ENERGY ECONOMICS

Demand for oil and gas is driven most by economic growth. There is a clear relationship, which is approximately .5% growth in energy input per 1% GDP growth for the U.S. and higher (.65:1, or more) for the developing world. The ebb and flow of world economic growth will determine oil demand more than any other factor. This growth in demand can be broken down into the per capita use and growth in population. For countries such as China, the per capita numbers are skyrocketing, as they industrialize and become the world's production site of choice. For countries such as the U.S., per capita has been remarkably stable with demand following population up. Net, world oil demand growth has been at that  $\pm 2\%$  per year for many decades. The recent world recessionary environment has generated several sluggish demand growth years. However, reacceleration started to appear in late 2003. If the current forecasts of 3% to 4% world GDP growth for 2004 materialize, oil demand will doubtless be back on the 2% trend, which is stronger than most forecasts we see.

Conversely, economic growth is the primary risk factor in energy prices. A collapse of Chinese growth, another very severe and economically disruptive terrorist strike, or a disruptive currency gyrations could derail energy prices. We recognize that these carry some possibility, but proceed on the assumption that disruptive events will be contained.

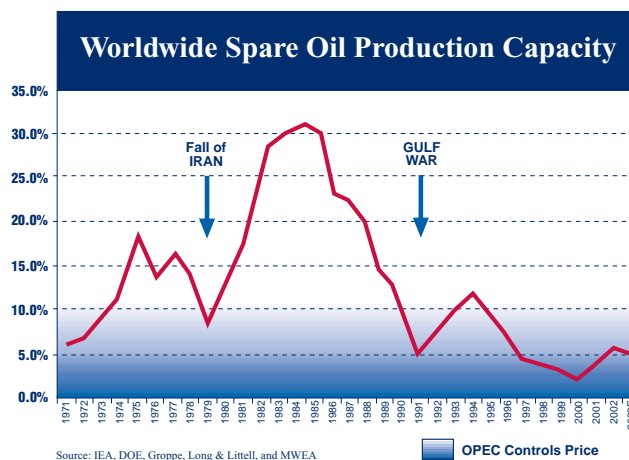
There has been some discussion that prices at current levels will suppress demand too much to get the usual growth result. We are unconvinced for several reasons. First, oil prices have averaged about \$27 per barrel for the last four years. The world economy has become acclimatized to high \$20s oil. Second, on an inflation-adjusted basis, oil prices are not particularly high relative to the last decade or so. In contrast with the 1970s, when real prices skyrocketed, current levels are not that much higher than the late 1980s/early 1990s. Third, a sharply lower dollar versus the Euro and Yen means that oil prices for much of the world are about the same as the oil of a year ago.

The other significant driver of energy demand is weather. Cold winters and hot summers can make a definite difference in usage patterns, especially the cold winters. Likewise, unusually mild winters can dramatically reduce consumption, especially North American natural gas. We always proceed on the basis that weather will be more or less normal, as we are not in the weather forecasting business!

While demand is remarkably stable and relatively predictable, supply is often quite volatile and subject to many non-economic factors. From OPEC, with their abrupt production shifts, to the geopolitical disruptions of wars (think Iraq), revolutions (Iran in 1979), strikes (Venezuela), accidents (pipeline ruptures – Phoenix gasoline), or civil strife (Nigeria) there is always something happening to reduce production or distribution to a level below normal capacity. The impact of these random events on prices depends entirely on the amount of spare capacity globally which can be activated to offset the disruption.

The conditions described above are all relatively short term in nature. The long-term determinate of supply is simply the economics of drilling. When prices are adequate exploration and development drilling will gradually increase supply until eventually excess supply drags prices down. Drilling subsidies, depletion does its work, and after some years of poor energy economics, supply is outpaced by demand and prices move back up to highly profitable levels (our *Tide* thesis). In energy, these cycles are quite long, ±25 years peak to peak typically, and generally go unrecognized. The last up cycle was 1970-1981, followed by seventeen years of down cycle. We are now in the early stages of a new (the fourth) up cycle that should last for many more years. The measure of these cycles is best captured in the amount of spare worldwide oil production capacity, as shown below.

The key dynamic of these cycles is that when spare capacity is low, OPEC has relatively little trouble controlling prices. Over the last four years, Saudi Arabia has varied oil production by about one million barrels per day (B/D) around a central tendency of 8 million B/D. That range, 7 million B/D to 9 million B/D, with a small additional swing from two other players (Kuwait, UAE), has kept oil mostly in the \$22-\$28 per barrel target



*With Worldwide Spare Capacity down in the 5% range, OPEC can exercise much better price control than conventional wisdom or energy pundits are prepared to accept*

range despite wild gyrations in global economic growth and the disruptions of 9/11 and the Iraq war. Inasmuch as there has been a relatively restrained drilling response to the new higher oil price equilibrium we conclude that the economics of the energy sector are likely to remain highly profitable for an extended period before the up cycle of this *Tide* is recognized as a major investment opportunity.

Near-term (2004) considerations involve many of the factors described above and include a great deal of controversy about just how much oil is being produced relative to current demand. The International Energy Agency (IEA) publishes estimates of supply and demand every month, with tables included that estimate world inventories. While this monthly Oil Market Report (OMR) is very widely used for estimating supply and demand conditions, it is subject to systematic errors and frequent large revisions. Last August, for example, they revised away about 200 million barrels of theoretical inventories

from previous years' production (*a significant downward adjustment in worldwide inventories!*). Left is a table showing OMR's supply estimates versus several other respected data sources. As you can see, they are consistently higher than all others. Unfortunately, the IEA's too-optimistic data continue to lead analysts to overestimate the amount of oil sloshing around the world and lead to output decisions by OPEC that leave us currently undersupplied.

Production: Million Barrels Per Day (B/D)			
	2000	2001	2002
<b>OMR</b>	75.0	76.0	74.7
<b>Oil &amp; Gas Journal</b>	73.0	72.8	72.0
<b>BP Corp.</b>	74.0	74.3	73.9
<b>Grope Long &amp; Littell</b>	74.2	74.0	73.0

Our efforts have tried to circumvent the data confusion by focusing on changes in production and OECD inventories as indicators of current conditions rather than build models around the *flawed* total output numbers. Data on oil in tankers, for example, are an important part of that work. This analysis presumes that world demand remains relatively stable as long as world GDP is steadily growing. Currently the issues being bandied about by analysts are the return of Japanese nuke generation (reducing oil demand), the pattern of Chinese oil buying (maybe less this winter), less gas to oil switching in the U.S., counterbalanced somewhat by declining production in Venezuela, and the delayed and difficult restart of Iraqi exports.

As we mentioned at the beginning, oil inventories are low. In fact, for the Atlantic basin (U.S. plus E.U. 16), inventories of crude plus products are at many-year lows. It is important to look at the whole basin, rather than just the U.S., as relative prices cause oil and products to move back and forth across the Atlantic. We conclude that the world has been marginally undersupplied. After some normal seasonal rebuilding in April and May (but certainly no more than normal, despite IEA pronouncements), global inventories went flat over the summer when they should have continued to build at least somewhat. Unless there is some mysterious third world secret oil depot, supply and demand must have been very closely in balance during summer and fall. And as prices have remained stubbornly high, the logical conclusion is that there is no excess production looking for a home!

If recent supply/demand conditions have been in balance, OPEC is talking about reducing supply, world economic growth is accelerating, and we are now in the winter period of peak demand, there should be plenty of room for some more non-OPEC production and some more Iraqi exports. The seasonal upswing in demand should be 1 to 2 million B/D from fall levels, starting from late October. While the rest of the investment community worries about too much oil, we worry about too little. If Iraq remains in turmoil, there is as little as 1 to 1.5 million B/D of spare capacity globally. With a tinderbox in Venezuela and low-grade insurgency in Nigeria, this is not a comfortable position for the world.

Fortunately, there will be a period next spring, when seasonal demand falls about 2.5 million B/D, when the world will have a breather in which to build an inventory cushion. Hopefully, oil prices can move into the middle of the \$22-\$28 range during that period and take some price pressure off consumers, as inventories rebuild.

## SECTOR VOLITILITY & ENERGY INVESTING

All this detail of the short-term situation is meant to call into question the pervasive (and perennial – *“they just push it out another year”*) CYA Wall Street forecasts of \$18 to \$20 oil. Even before the Venezuelan strike and the Iraqi shutdown, OPEC was able to engineer a quick rebound in oil prices after the 9/11 shock. That is the whole point of our *Tide* thesis. Despite short-term volatility, when spare capacity is so low, oil prices float up a whole lot easier than they float down. We stick with the long-held forecast that oil prices will center on a \$22 - \$28/barrel range on a long-term basis. This cycle has just begun, and despite the volatility inherent in energy, provides a compelling investment opportunity.

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