

Oil, an asset featuring constructive strategic supply/demand dynamics

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Few commodities are as integral to the functioning of today's globalized economy as oil. Oil's presence and essence are hard to overstate. Yet, at first glance, "black gold" is invisible to the naked eye, i.e., until one looks in virtually any direction and sees plastics, composites, textiles, asphalt, etc. and then dwells on the key underlying feedstock. Meanwhile, oil's role in fueling transportation vehicles from farm tractors to cars to planes to diesel trains is presently unrivaled. In short, the world is

very oil dependent and will become even more so as emerging-market per capita consumption levels rise from mere fractions of current OECD levels. Yet signs abound that we are increasingly facing oil supply constraints. The exploitation of our oil endowment will progressively unearth oil's uniqueness, namely that there aren't good substitutes as is the case for so many other commodities. That same lack of substitutability forces the pricing mechanism to balance supply and demand. In a nut-

shell, this is the foundation for our bullish long-term oil price scenario.

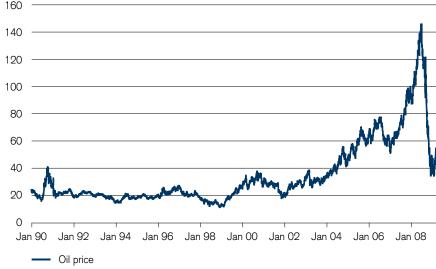
Supply

Just how important is oil's role in our global energy needs? Oil supplies 35% of our energy (see chart 2).

Various sources suggest that we've used roughly half the earth's oil endowment – the easy and cheap half to access. Despite increased drilling and technology improvements, the world continues to find significantly less oil than it did in peak year 1964, and over 75% of what's left has been nationalized, making oil assets harder to acquire. Increasing oilfield depletion rates further pinch supply (see table 1 and chart 3).

Assuming all of the estimated proven reserves of 1,238bn barrels (see chart 4) were recoverable, at recent world usage rates they would yield only 40 years of remaining supply. Given rising energy returned/energy invested (ERoEI) constraints – oil is getting much harder to reach – less than the remaining proven reserves will likely be recoverable. In addition to worsening ERoEI ratios, there is a broad consensus that oil below \$65 a barrel serves to discourage drilling, as attested by sharply declining exploration activity over the past six months, casting

Chart 1: Oil price



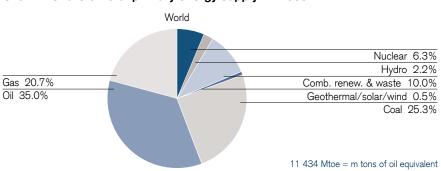
Source: Bloomberg, Credit Suisse

an additional mid-term "supply adequacy shadow" over the market:

- According to Mr. al-Naimi, the Saudi Arabian oil minister, low prices, weak demand, high exploration costs, tight credit and energy policies focused on alternative fuel sources have all combined to hurt spending on new projects
- The IEA reckons that overall oil industry investment will drop 15%–20% in
- The number of drilling rigs in use around the world fell by 32% in the year to April to 2,055, according to Baker Hughes.
- OPEC countries, according to Mr. el-Badri, the organization's secretary general, are canceling or delaying 35 big projects.
- Cambridge Energy Resources Associates estimates that 5.5m bpd of capacity additions will fall by the wayside worldwide over the next few years, an amount equal to one third of the projected net increase in oil output by 2014.

All in all, the world will most probably remain challenged to find new, material sources of oil to both offset oilfield depletion and to secure new net reserves. Ironically, the power of new technology may be primarily allowing us to get existing oil out faster, rather than assuring us more supply, placing even more pressure on depletion rates. This paradox is evident at Cantarell, Mexico's largest oilfield, which is arguably a microcosm of sorts of annual global oilfield depletion rates in the 5%-8% range. According to Simmons & Co. (www.simmonscointl.com), for 15 years that field produced 1.5m barrels per day (bpd) with

Chart 2: Share of total primary energy supply* in 2005

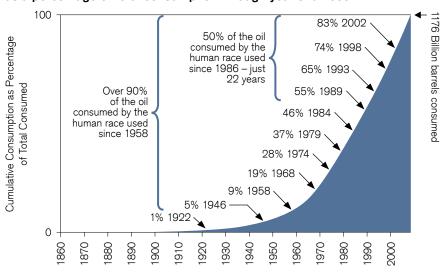


* Share of TPES excludes electricity trade.

Barrel of oil equivalent (BOE) is a unit of energy based on approximate energy released by burning one barrel (42 U.S. gallons) of crude oil, the equivalent of 1.70 MWh per day.

Source: International Energy Agency

Chart 3: Cumulative oil consumption by the human race as a percentage of total consumption through year-end 2008



Source: UBS

the precision of a "Swiss watch movement." Then a natural decline manifested itself. Pemex responded by drilling dozens of new wells and injecting nitrogen gas. As a result, output shot up to 2.1m bpd in 2004. This was followed by an "enhanced extraction technology"

collapse with Cantarell output recently down to 800,000 bpd. Current developments in Norway, the world's fourth biggest crude exporter, tell a broadly comparable tale, as preliminary April oil production there fell 7% to 1.99m bpd from March's 2.15m bpd level.

Table 1: Oilfield depletion

Year	Bn of global barrels of oil found	Bn of global barrels used	Annual Surplus/deficit
1930	10.0	1.5	8.5
1964	48.0	12.0	36.0
1988	23.0	23.0	0.0
2005	5.5	30.5	-25.0
2006	6.5	31.3	-24.8

Moreover:

- The global oilfield depletion rate is between 5% 8% p.a., reducing production by 1.5bn 2.5bn barrels p.a. or in excess of Iran's (world's 4th biggest producer) annual oil production of 1.5bn barrels. Implication: just to arrest depletion, the world needs to find an equivalent of a "New Iran" every year.
- Due to geophysical reasons, peak oil production tends to lag peak oil found (in1964) by 35 40 years.
- We've used nearly half of the world's estimated oil supply in just over 100 years. That's 1,176bn barrels to date (the bulk since 1958).

Source: Weeden & Co, UBS, International Energy Agency, USGS & Colin Campbell

Demand

Oil demand is quite inelastic (see table 2). This is thanks to oil's unrivalled energy content, stability, transportability, and use versatility earmarks coupled with unequaled exploitation, storage, delivery and usage infrastructure investment. In addition, most of the cost of oil-based energy is not comprised of the fuel itself, but in the massive infrastructure of furnaces, turbines and engines. As these are all sunk costs, carbon-free alternatives featuring large front-end capital expenditures must be inexpensive enough to trump oil and its existing infrastructure – a tall order indeed.

Growth in secular oil demand should come from two primary sources above and beyond global GDP growth. The first

Table 2: Near-term global oil supply and demand overview

	Q3 2007	Q4 2007	Q1 2008	Q2 2008	Q3 2008	Q4 2008	Q1 2009	Q2 2009	2007	2008
Demand (mbd)										
OECD	48.83	49.81	48.68	47.09	46.48	47.65	46.75	44.69	49.13	47.48
Growth YoY	-0.81%	-0.44%	-2.03%	-2.26%	-4.81%	-4.34%	-3.96%	-5.10%	-1.01%	-3.36%
Non-OECD	36.81	37.20	37.71	38.14	38.25	38.61	37.90	38.38	36.77	38.18
Growth YoY	3.72%	4.14%	3.94%	3.67%	3.91%	3.79%	0.50%	0.63%	3.27%	3.83%
China	7.54	7.61	7.74	7.99	8.05	8.16	7.92	8.17	7.56	7.99
Growth YoY	4.00%	4.53%	5.31%	3.10%	6.76%	7.23%	2.33%	2.25%	4.09%	5.59%
TOTAL WORLD DEMAND	85.64	87.01	86.39	85.24	84.73	86.26	84.65	83.07	85.90	85.66
World demand growth YoY	1.09%	1.48%	0.49%	0.32%	-1.06%	-0.86%	-2.01%	-2.55%	0.78%	-0.28%
Supply (mbd)										
Non-OPEC	49.83	50.14	49.68	49.78	49.48	50.06	49.52	50.01	50.04	49.75
Growth YoY	-0.28%	0.04%	-0.70%	-0.78%	-0.70%	-0.16%	-0.32%	0.46%	0.00%	-0.58%
OPEC	34.42	35.15	35.66	35.83	36.24	35.11	33.08	33.48	34.39	35.71
Growth YoY	-1.97%	2.06%	5.10%	5.26%	5.29%	-0.11%	-7.23%	-6.56%	-1.12%	3.85%
Crude Oil Portion	30.09	30.81	31.25	31.40	31.74	30.62	28.56	28.69	30.05	31.25
Other Liquids	4.33	4.34	4.41	4.42	4.50	4.49	4.52	4.79	4.33	4.46
TOTAL SUPPLY	84.25	85.29	85.33	85.61	85.73	85.17	82.60	83.49	84.43	85.46
World Supply growth YoY	-0.99%	0.86%	1.63%	1.66%	1.76%	-0.14%	-3.20%	-2.48%	-0.47%	1.22%
World Market Balance										
SUPPLY - DEMAND	-1.39	-1.72	-1.06	0.37	1.00	-1.09	-2.05	0.42	-1.47	-0.19

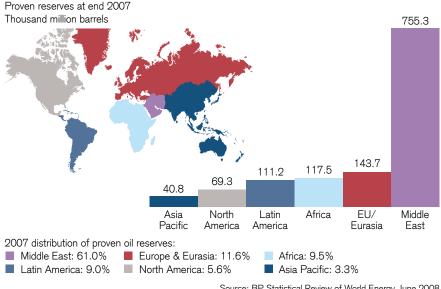
Source: International Energy Agency, Credit Suisse

stems from a perhaps unexpected arena: the pronounced global lack of investment in scalable nuclear-powered electricity generation as well as OECD countries' reticence to increase coal-fired electricity generation. This neglect serves as a longterm impediment to large-scale rollouts of electricity-powered cars. This not only increases our reliance on oil as a transportation fuel, but it also serves to undermine our ability to migrate to energy sources that promise reduced aggregate carbon emissions. Lower CO2 ouput would be courtesy of big power plants' much higher efficiency than the gasoline engines in our cars. This efficiency, in turn, would allow plug-in hybrid cars running on grid-supplied electricity to offer a more carbon-frugal "global" transportation energy solution. (Source: Peter W. Huber, PhD, Mechanical Engineering from MIT; www.manhattan-institute.org/html/huber.htm)

The second source of long-term growth in oil demand is demographically driven. It primarily involves population-dominating Asia (Ex-Japan)'s low per capita energy consumption rates, both in absolute terms and relative to OECD nations (see chart 5).

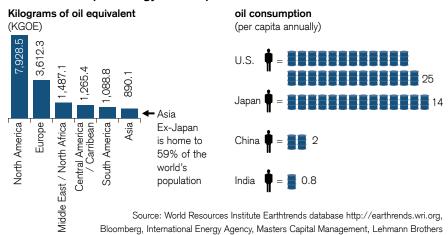
The pronounced energy consumption gap is sure to decrease (further) over time thanks to outsized emerging-market economic growth and urbanization, inevitably driving worldwide oil demand higher. In fact, despite heightened energy efficiency measures introduced since last year's record \$147-a-barrel oil price, the IEA recently projected a tempered 106m bpd consumption level by 2030. While this is down 9% from its previous estimate, it is still the equivalent of an average compound annual growth rate of 1.2% over the next 21 years.

Chart 4: Proven oil reserves of 1,238bn barrels



Source: BP Statistical Review of World Energy June 2008

Chart 5: Per capita energy consumption



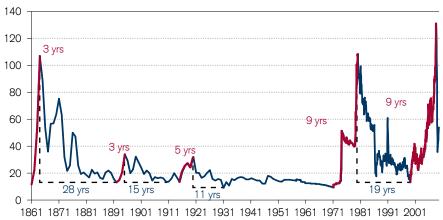
Oil as an investment

If long-term supply/demand dynamics are oil price supportive, how attractive is oil at current price levels in the high \$50 per barrel range? While oil prices have recovered sharply and quickly from the depths of the low \$30 levels earlier this year, they

are still attractive in real price terms, historically speaking (see chart 6).

Separately, indispensable oil is an excellent USD devaluation hedge (see chart 7). Broadly speaking, the price of oil rises as the dollar weakens because oil

Chart 6: Real oil prices - 2007 prices



Source: DataStream, Credit Suisse Global Strategy

Chart 7: USD/EUR and oil



is priced throughout the world in USD. Such a dollar hedge is arguably a long-term "must have" in light of US fiscal and monetary policies and the increasing current account deficits they have consistently been associated with over the past decade. With the US balance

of payments deficit currently deteriorating immensely, with little if any improvement in sight, such a hedging allocation is probably even more appropriate.

Near-term, however, and in contrast to bullish long-term oil price expectations,

oil prices may well be both technically and fundamentally ahead of themselves. Technically, an asset that has shot up by well over 50% within a quarter is due for a correction, or at least a consolidation. Fundamentally, as recently noted by the IEA, signs are multiplying that oil is overbought: "demand is at its weakest level in two decades and oil inventory in big consuming nations continues to swell to its fattest level also in two decades."

Conclusion

Initial strategic investments in oil assets are recommended with a view to increasing stakes on oil price pullbacks. As the year progresses, stout global reflationary policies, at the monetary and increasingly at the the fiscal level, should help stabilize and then support oil demand at both the operating and the asset allocation levels, as oil is also an excellent inflation hedge. Long-term, a constructive supply/ demand scenario best described as sustained low supply reductions juxtaposed against low demand growth should push oil significantly higher than current levels. Patterns of new all-time highs featuring higher lows over time are eminently plausible, in our view. In the interim, it's perhaps worthy of mention that the market will increasingly discount an economic recovery, so strategic oil asset purchases should be undertaken prior to the return of cheerier economic growth and arguably even prior to the return of a rosier macroeconomic consensus.



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