

Got Energy?

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At some point over the next several years, recognition of the coming energy crisis will reach critical mass—a “tipping point”—and when it does, the key competitive question investors will be asking countries and companies alike will be: Got energy?

That’s because energy is unlike any other commodity. Most commodities can be replaced: trees can be planted, food can be grown, consumer goods can be manufactured, and money can be printed. Those that can’t be replaced are often reusable, such as diamonds and gold. But energy is finite and irreplaceable. Once you use it, it’s gone.

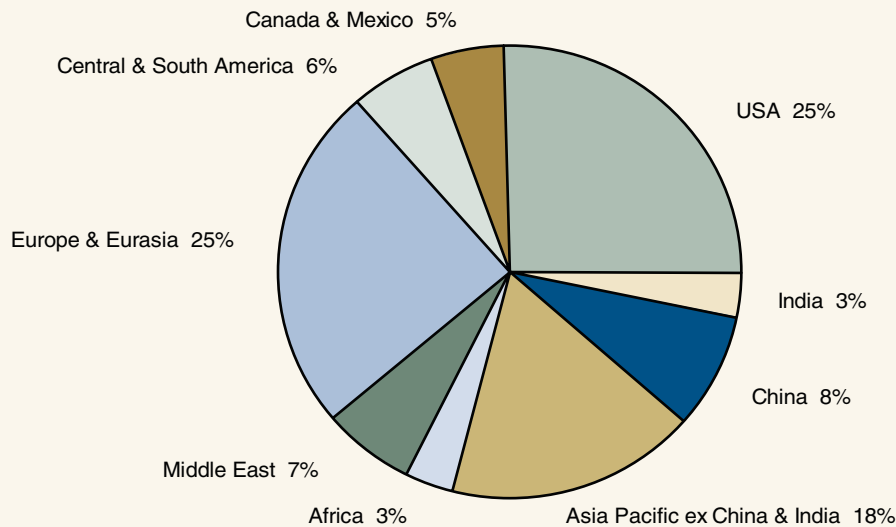
So, when the tipping point comes and people fully grasp the magnitude of the impending energy crisis, those who don’t have energy will have to pay those who do. And perhaps pay dearly because, remember, there is a finite supply.

Hurricanes Katrina and Rita illustrate how little room for error there is in today’s energy markets. However, the energy crisis itself is being caused by five long-term factors: (a) rising global demand, (b) changing consumer and investor preferences, (c) growing oil dependency, (d) under-investment, and (e) shrinking spare capacity.

For several years already, PIMCO has been bullish on the long-run prospects for the energy sector. Our portfolios have favored energy companies and selective emerging market countries based on our secular view that the price of energy should be supported by the factors mentioned above. Let’s examine each in turn and then consider the investment implications.

Rising Global Demand

One of the most important secular developments in our lifetime is happening right before our eyes, as China, India, Eastern Europe, and several other highly populated economies in Asia emerge into the global marketplace. The industrialization of these developing economies will have enormous implications for global labor markets, the environment, financial markets, inflation and the demand for natural resources. Within the energy sector, we have only seen a glimpse of what may be on the horizon.

Chart 1: Share of World Oil Demand in 2004

Source: ISI

Global demand for energy has been robust and shows no signs of letting up on a long-term basis. China is a perfect example of the demand growth from rapidly expanding emerging markets that we can expect in the future. China's oil imports have been growing at double-digit rates year-over-year¹. This pace is not likely to slow given China's significant infrastructure spending. Rural workers are migrating to jobs in manufacturing facilities near port cities. This boost in labor is supported by the economy's export-led growth machine. China has a strong incentive to maintain this economic growth in order to ensure political stability.

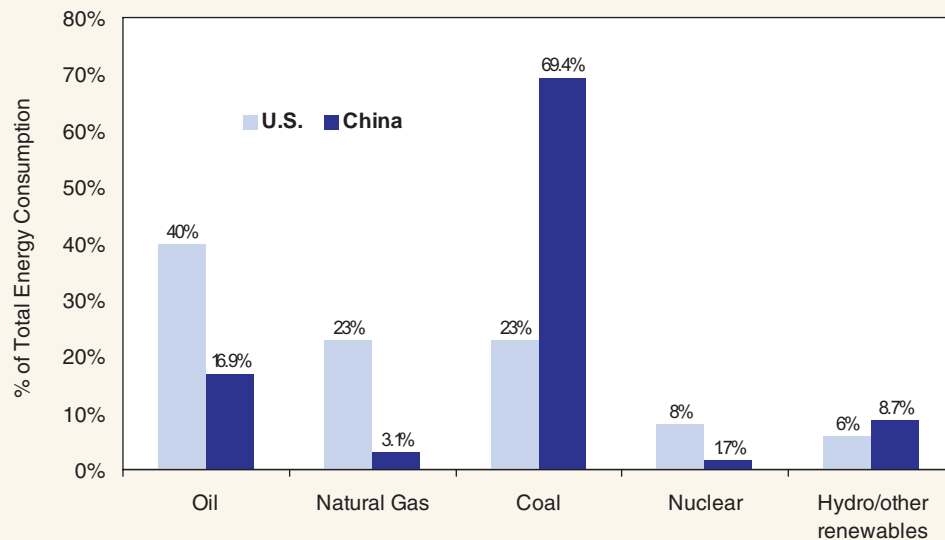
China's demand for oil has not yet caught up with its population growth. Today, China consumes roughly 7 million barrels/day of oil, or approximately 8% of the world's consumption of 84 million barrels/day of oil² (chart 1). Yet, with 1.4 billion people, China represents over 20% of the world's population.³ To put its oil consumption in perspective, China is consuming 30% of the world's coal, 26% of the world's steel,

21% of the world's soybeans and 20% of the world's copper.⁴ Given China's population size and economic growth, rising consumer interest in automobiles and demand for other energy-intensive luxury goods, it is only a matter of time before the country's demand for crude oil catches up with its demand for other commodities.

Demand for energy is also set to take off throughout most emerging market countries. This will materialize when consumer spending naturally picks up as young populations mature and already pent-up demand for consumer durables, such as automobiles and housing, continues to rise. For example, in China, auto sales are growing faster than 20% annually.⁵ By the end of the decade, the IMF projects China will be the second largest auto market in the world, with 8 million new car sales per year,⁶ compared to 17 million currently in the U.S.

As China and other emerging markets industrialize, the secular increase in demand for energy will only intensify due to these countries' rising

Chart 2: U.S. and China Energy Consumption



Source: EIA / China Statistical Yearbook

dependency on energy-intensive manufacturing as their main source of economic growth. With respect to growing demand for energy, the U.S. Department of Energy in March of 2005 said simply, “The world has never faced a problem like this.”

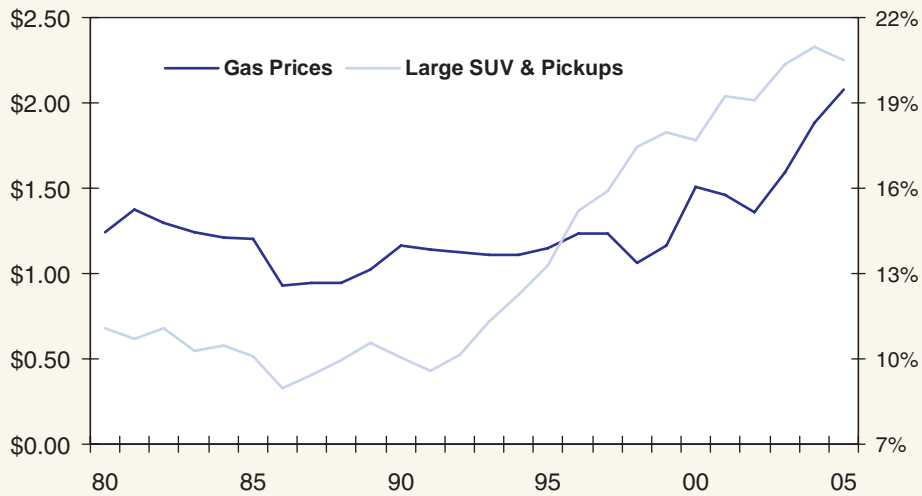
Changing Consumer and Investor Preferences

As China industrializes and accumulates additional wealth, oil consumption will most likely swell. Increasingly, transportation will be by automobile and airplane which depend on oil for fuel. If Chinese energy preferences come to mirror those in the U.S., the consumption of both oil and natural gas will surely rise. Today, oil constitutes only 17% of China’s total energy consumption as compared to 40% in the U.S. (chart 2).⁷ Therefore, we expect oil prices to be supported by changing consumer tastes and growing long-run demand within the expanding emerging markets.

Consumer preferences in developed countries are also impacting the demand for energy. This is particularly apparent in the U.S. where sales of large SUVs and pickup trucks, as a percent of overall auto sales, have risen sharply for the past 15 years (chart 3). As more “gas guzzlers” have taken to America’s roads, U.S. fuel efficiency has shown only modest improvement despite technological progress. As a nation, we have sacrificed energy efficiency for consumerism. This trade off is likely to occur in developing nations and is a preview of what is to come. Consumerism is here to stay. The era of cheap oil is over.

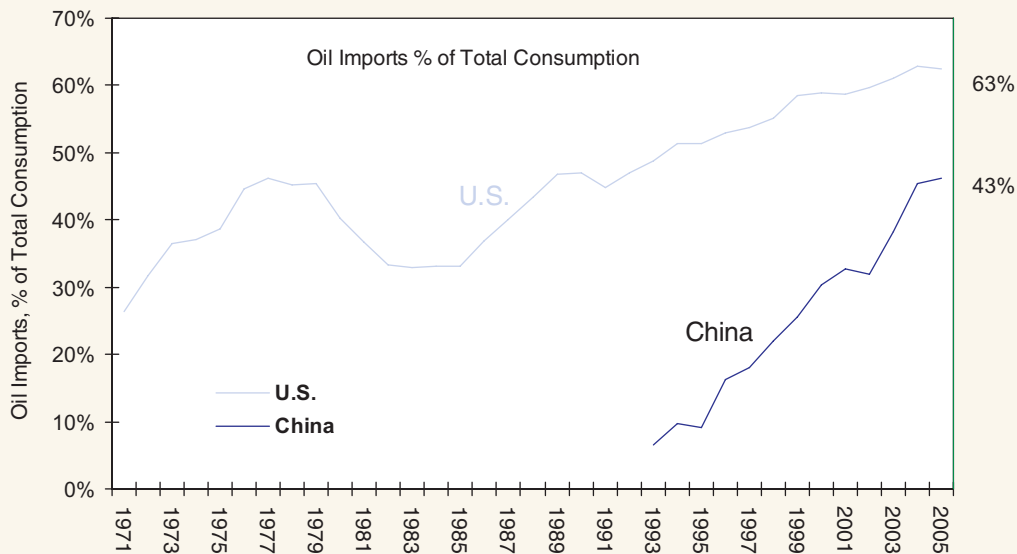
Change in investors’ appetite is another trend leading to rising global demand for energy. Over the past several years, commodities have delivered strong investment returns. Reacting to this solid performance, global investors have moved money into the commodity sector, which has resulted in incremental demand for oil futures and over-the-counter swap contracts. Low real interest rates globally have also driven a “search for yield” into alternative products. The prices of

Chart 3: Large SUV & Pickup Share vs Gas Prices



Source: Ward's Automotive and Ward's Transportation

Chart 4: Growing Oil Dependency



Source: ISI

energy products, including crude oil and natural gas, have increased due to this new demand.

Growing Oil Dependency

The U.S. uses roughly 21 mm barrels/day of oil, approximately 25% of world consumption.⁸ More importantly, the U.S. is becoming increasingly

reliant on imports to meet its growing demand. Today, over 60% of U.S. oil consumption is met through imports (chart 4), compared to less than 40% in the early 1980s.⁹ China is now in the same boat with over 40% of its 7 million barrels/day of demand imported. In fact, import dependency in China is rising faster than in the United States. It

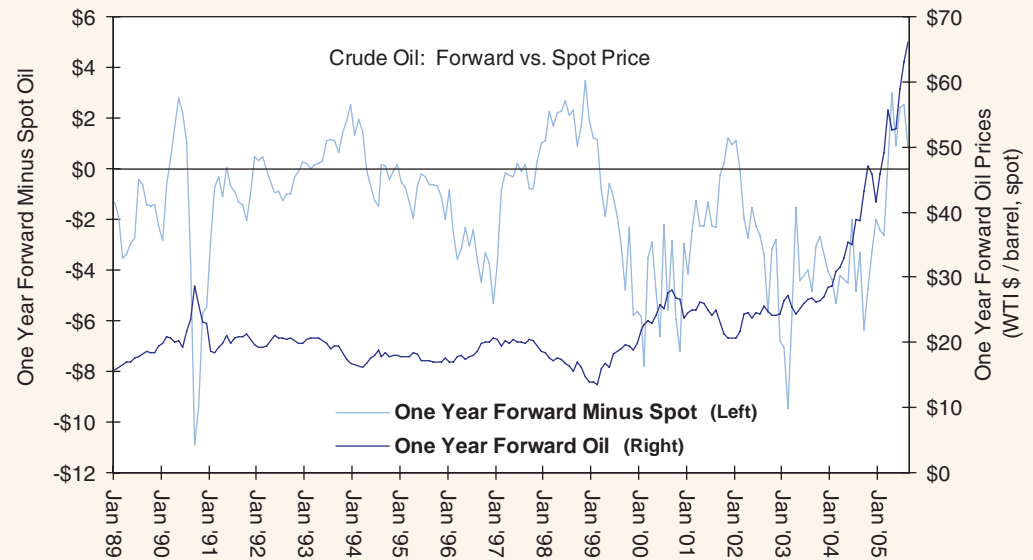
is no wonder China is scrambling around the globe in an effort to secure energy resources.

The physical location of the world's proven oil reserves also has increasingly significant implications for the price of this commodity. It just so happens that 64% of the world's proven oil reserves are located in the Persian Gulf region. Within this area, the largest

countries with proven reserves include Saudi Arabia (20%), Iran (10%), Iraq (9%), United Arab Emirates (8%), and Kuwait (8%).¹⁰ As this region's political instability attracts attention, the U.S. and other developed countries are becoming more dependent on imports to satisfy their energy needs. Terrorist threats are rising at some oil wells, ports, refineries and pipelines. Mounting geo-political uncertainty is leading to a higher risk premium in the energy market. As evidence, forward price contracts for crude oil are now trading at a premium to spot prices for crude oil (chart 5).

Because so many countries, like the U.S. and China, rely so heavily on imported oil, geo-political uncertainty and strategic factors are also affecting energy demand. Rising geo-political risk is leading to stockpiling of oil inventories as global competition to secure long-term energy resources intensifies. (This was a major theme in the book *Resource Wars* by Michael Klare, a PIMCO Secular Forum speaker in May 2005).

Chart 5: Rising Forward Oil Prices Suggest Rising Oil Dependency and a Risk Premium



Source: Bloomberg

As evidence of this trend, the U.S. has built-up its strategic petroleum reserves to 700 million barrels and may add up to 300 million more barrels over the next several years.¹¹ Similarly, China and India have been stockpiling oil. However, their strategic petroleum reserves are modest in comparison to both U.S. levels and their countries' longer-term needs.

Taken together, the cumulative effect of emerging market industrialization, changing consumer and investor preferences, and strategic stockpiling has steadily increased global oil demand.

While global oil production is still rising, we are getting closer to the point where the world's production of oil cannot keep up with this incremental demand. At some point global oil production will peak and we will start down a production decline curve where available supply shrinks over time. Rising demand and the eventual decline in global production means the price of oil should trend up over time. In addition, the price of oil should be supported in the near-

term by demand from countries such as the U.S., China and India, which are in competition to secure energy sources and are increasingly reliant on foreign imports to satisfy their demand. Given these developments, combined with the fact that oil is primarily located in areas of extreme political uncertainty, it is not surprising that spot and forward energy prices are rising.

Under-Investment

U.S. energy companies have under-invested for decades in infrastructure, exploration, pipelines and engineers. The U.S. has not built a new refinery since 1976.¹² In fact, in 1981, there were 325 refineries in the U.S. with a capacity of 18.6 million barrels per day. Today there are 148, with a capacity of about 17 million barrels per day – though U.S. demand for gasoline has increased more than 20%.¹³ Rising costs to comply with environmental regulations have depressed new refining investment to the point that the U.S. refining industry is now currently operating at 95% of capacity. The U.S. has also under-invested in liquefied natural gas (LNG) terminals. This is important because the U.S. has limited import capacity to store natural gas and no strategic natural gas reserves. In addition, large U.S. multinational energy firms have barely increased exploration and production (E&P) investment despite soaring demand, record energy prices and an increasing ability to invest, given rising cash balances. As evidence, while rig counts have increased recently, drilling and production is nowhere near where it was in the early 1980s¹⁴ (**chart 6**). Why? Energy companies are finding it more difficult and costly to locate oil. The low-hanging fruit has been picked.

To make matters worse, costs to access foreign oil are rising as foreign governments keep U.S. companies from picking the low hanging fruit.

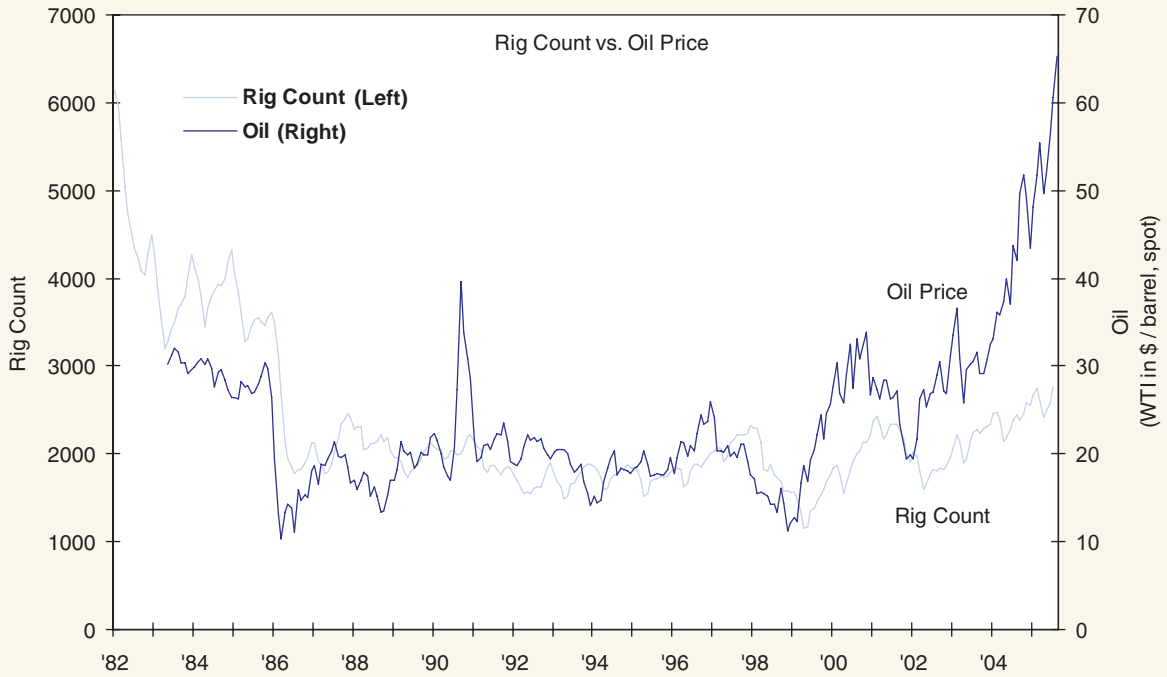
U.S. corporations are increasingly being denied drilling access to foreign oil reserves. Those countries that allow companies in are collecting a significant chunk of future profits on all oil discoveries. In most cases, U.S. firms pay all exploration, development and royalty costs on new drilling projects, in addition to handing over the majority of the resulting future income to the foreign government. For example, Venezuela's government has attempted to renegotiate oil contracts with foreign oil companies to get a larger share of the revenue. The infrastructure costs of drilling are also rising because companies are having to drill deeper and in more hostile and volatile regions. Given these factors, it is not surprising that managers of U.S. energy corporations are increasingly redirecting cash toward share buybacks and dividend increases as opposed to exploration, production and new refining capacity.

Shrinking Spare Capacity

As a result of surging demand from developing countries and continued healthy demand from developed countries, the world has likely reached the point where global demand is surpassing the world's ability to supply incremental oil. The International Energy Association (IEA) in April 2005 went so far as to say, "Oil consumption has caught up with the installed crude and refining capacity." In fact, spare capacity as a percent of total production is now approaching all time lows (**chart 7**).

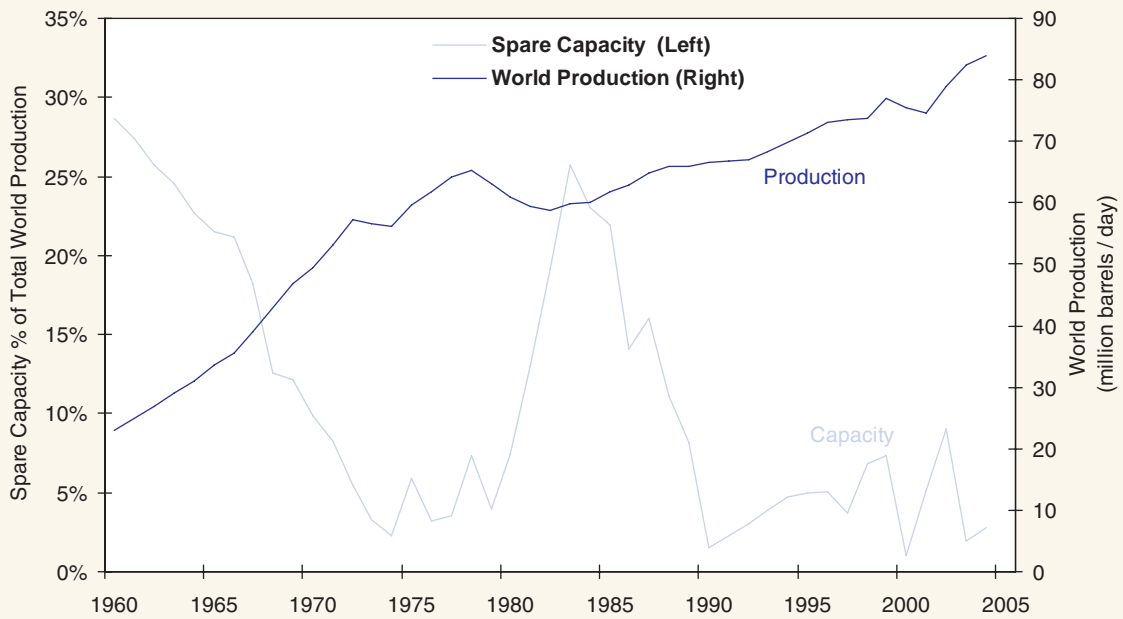
It seems that the supply constraints the world is now facing are real and will only intensify over time. Saudi Arabia, the largest OPEC producer, has ramped up its daily production to approximately 10 million barrels/day. It hopes to be able to turn on the taps to 12.5 million barrels/day by the end of the decade. While OPEC's current

Chart 6: Under-investment



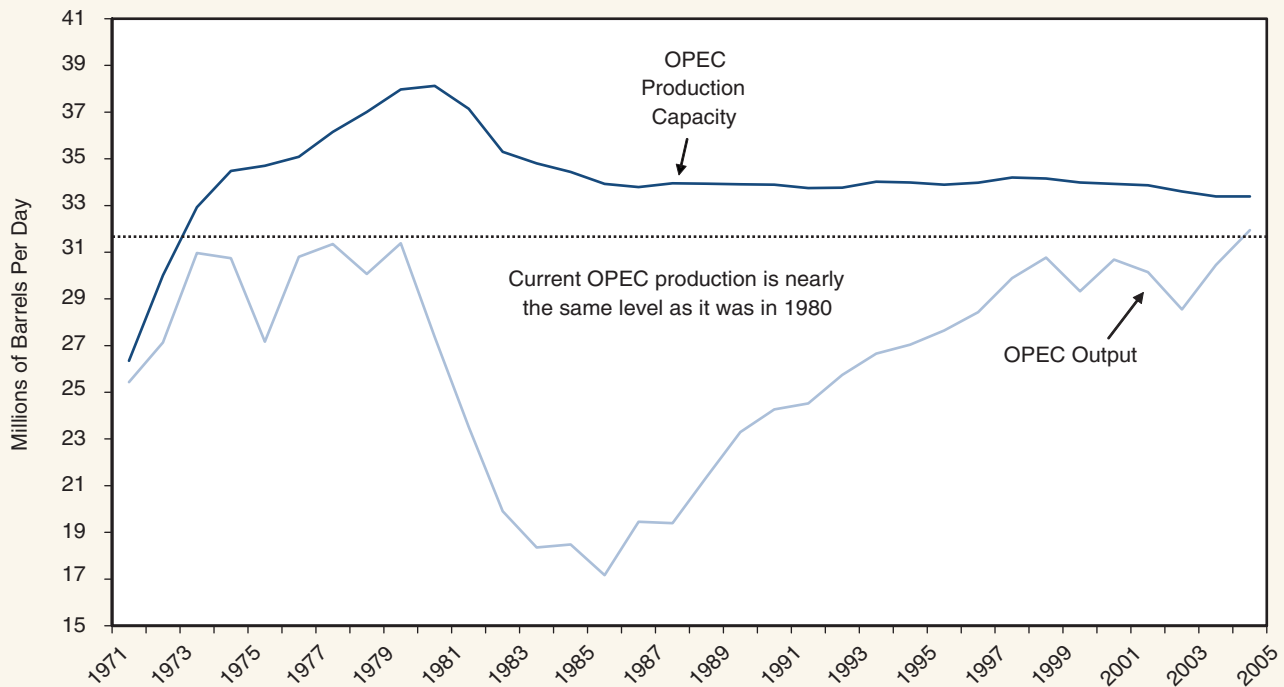
Source: Baker Hughes

Chart 7: Shrinking Spare Capacity



Source: HETCO

Chart 8: OPEC Production Capacity vs. Output



Source: International Energy Agency (IEA) and Goldman Sachs Commodity Research

production has been rising, this increase will be limited due to OPEC's failure to expand production capacity (**chart 8**). Production disruptions are increasing in both OPEC countries, like Iraq and Nigeria, and non-OPEC countries, like Ecuador. Hurricanes have also impacted, and may continue to impact, U.S. production in the Gulf of Mexico. This helps to explain why oil prices have remained elevated. Given rising geopolitical uncertainty, the world has become increasingly dependent on Saudi Arabia's ability to meet rising global oil demand. Simply put, Saudi Arabia, the swing supplier of oil to the world, must expand capacity to make up for the modest capacity growth prospects elsewhere in the world. As a result, the security of its oil fields and the flow of energy throughout the Middle East have been and will remain a top global security interest.

OPEC Production Capacity vs. Output

While Saudi Arabia and other OPEC countries have been keeping up with current demand, it is not clear that they will have the ability to do so in the future. Saudi Arabia may be approaching the limit of its natural geological ability to increase additional capacity. The country claims to have ample spare capacity to meet global demand. However, Saudi Arabia has not let outsiders in to verify its oil reserves. If Saudi Arabia has the ability to increase production, why haven't we seen it? Saudi Arabia's oil production over the past 4½ years has only increased by approximately 1 million barrels/day.¹⁵ The country's peak oil production was 10.4 million barrels/day back in 1978.¹⁶ Why isn't the country taking more dramatic steps to ramp up production given today's high prices? This is unknown. What is known is that oil prices are rising and the lack of

spare capacity is no longer an issue the energy markets can ignore.

PIMCO's Investment Strategy in Energy

Because of the long-term trends discussed above, the energy sector has been performing strongly over the past few years. Nevertheless, we believe energy will continue to outperform on a secular basis for years to come because of the above mentioned themes which we feel will support energy prices.

Donna Riley, our energy analyst, and I have been immersed in energy research over the past several years. In meeting with CEOs, CFOs and senior management, we have attempted to gain insights into both top-down and bottom-up factors driving energy prices. While my focus has been primarily top-down, Donna has focused intensively on the bottom-up analysis of individual energy companies.

Bottom-up research focuses our energy investments on companies with four primary characteristics. These key traits are low cost production and reserve replacement, diversified asset base, long reserve life and strong management team.

Low cost production and reserve replacement are crucial to long-term success in the oil and gas industry. Low cost operations allow for greater margins in high oil price environments and large cushions during economic downturns.

Companies also need to be able to replace reserves efficiently. We especially look for firms that achieve low cost, organic replacement. By this we mean companies that can restore over 100% of production annually through drilling and exploration rather than through acquisition. Possession of these qualities indicates operational expertise and suggests a trend that can be maintained into the future.

We like companies with large, diversified asset bases. A corporation with production in several different fields and/or regions provides greater protection for bondholders in the face of geological difficulties, weather-related events, and other unforeseen situations. In addition, we prefer firms with most of their assets in stable geographic regions because this minimizes geopolitical risk.

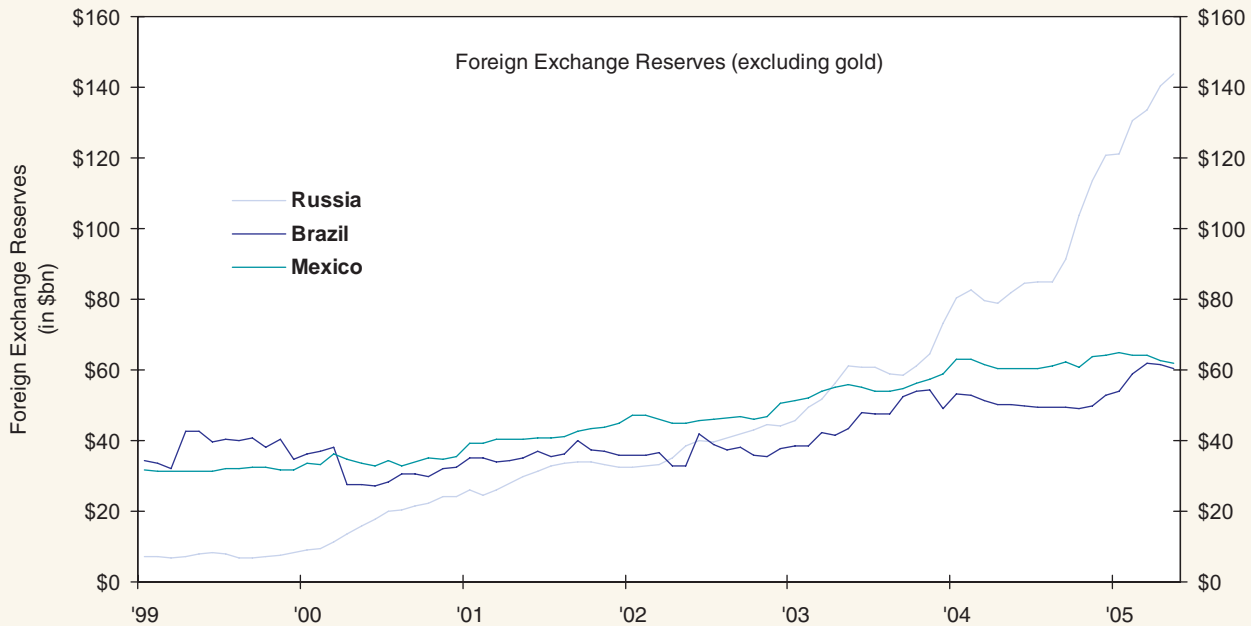
A long reserve life demonstrates a company's ability to sustain its current production for several years without replacement. Reserve life is calculated by dividing total reserve base by annual production. A long life means a company could potentially generate cash flow for several years without replacing reserves, if this became necessary.

Finally, we look for strong management teams with successful track records in the industry. We have built strong relationships with executives at many companies within the oil and gas sector. We leverage these connections to evaluate peer performance.

Not only do we invest for our clients in energy companies directly, we also passively invest in energy through the PIMCO commodity real return strategy, which derives a third of its commodity exposure from the energy sector.

Lastly, PIMCO's investment strategy in emerging markets has also been influenced by our long-term bullish secular outlook for energy. Members of our Emerging Markets team have been responsible for directing our emerging market investment strategy towards countries with improving internal credit fundamentals and a significant external tailwind. Our strategy specifically targets countries whose export growth is positively influenced by, or linked to, China and other develop-

Chart 9: Emerging Markets' Fundamentals Positively Impacted by Commodity and Energy Prices



Source: Bloomberg

ing countries' strong demand growth for commodities and energy.

Several of PIMCO's favorite country picks, including Russia, Mexico and Brazil, have benefited from a rapid improvement in export growth which has caused trade deficits to turn into surpluses. More importantly, these countries have prudently managed their financial balances by using solid export growth to build up large exchange reserves (**chart 9**). This positive development has resulted in credit upgrades for all three of these countries. Given strong secular demand that will support energy prices over the longer-term horizon, we continue to remain positive on several selective emerging market credits based on our expectation of improving fundamentals.

Energy as a Secular Investment

Our long-term, bullish outlook for energy prices reflects positive secular demand and supply

factors. In terms of demand, over the long run, energy prices will be supported by the industrialization of the emerging markets and changing consumer and investor preferences. In terms of supply, spare capacity will remain limited due to under-investment in energy resources and growing import dependency by the industrialized and large industrializing emerging market nations. However, we recognize that the global economy also has cyclical tendencies. A slowdown in economic growth will negatively impact the outlook for energy in the short-term.

PIMCO expects U.S. economic growth to slow over the course of the next year, as the factors that have stimulated consumer spending, including low interest rates, tax cuts and the surge in the housing market, fade and higher oil prices eat into corporate profits. PIMCO's current corporate positioning in light of this view is detailed in my article entitled "Set-up and Swing," published in July of 2005. If the U.S. economy slows, energy

prices could come under pressure. Despite our cautious, cyclical outlook for the economy, we believe the energy sector and related investments will outperform on a long run, secular basis.

Got Energy?

Cheap energy is a thing of the past. The world's increasing demand for energy is now colliding with the simple reality that crude oil production is nearing capacity limits at the same time that under-investment in refining and natural gas infrastructure is leading to bottlenecks in energy

supplies. This dilemma is intensified by the industrialization of China and other emerging markets, global competition to secure energy assets, rising import dependency, and geo-political uncertainty. Energy is a unique resource that causes a high degree of uncertainty worldwide, given rapidly evolving secular and economic factors. It poses to individuals, companies and countries the question, "Got Energy?"

Mark Kiesel
October 1, 2005

¹ *British Petroleum Statistical Review*

² www.imf.org, International Monetary Fund, World Economic Outlook, April 2005, Chapter IV: *Will The Oil Market Continue to Be Tight?*, Figure 4.2: Oil Consumption

³ www.cia.gov

⁴ U.S. Geological Survey, Energy Depart., Agriculture Department

⁵ Bloomberg, China Retail Sales Cumulative Automobiles Index

⁶ www.imf.org, International Monetary Fund, World Economic Outlook, April 2005, Chapter IV: *Will The Oil Market Continue to Be Tight?*, Table 4.9: Vehicle Ownership Projections

⁷ www.eia.doe.gov & China Statistical Yearbook

⁸ www.imf.org, International Monetary Fund, World Economic Outlook, April 2005, Chapter IV: *Will The Oil Market Continue to Be Tight?*, Figure 4.2: Oil Consumption

⁹ www.eia.doe.gov

¹⁰ www.imf.org, International Monetary Fund, World Economic Outlook, April 2005, Chapter IV: *Will The Oil Market Continue to Be Tight?*, Figure 4.4: Oil Production and Reserves

¹¹ www.eia.doe.gov, United States of America, Country Analysis Brief

¹² www.eia.doe.gov, United States of America, Country Analysis Brief

¹³ *Wall Street Journal*, Refining Incapacity, page A16, September 28 2005.

¹⁴ www.eia.doe.gov, United States of America, Country Analysis Brief

¹⁵ www.eia.doe.gov, Saudi Arabia, Country Analysis Brief

¹⁶ www.eia.doe.gov, Saudi Arabia, Country Analysis Brief

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