

The Coming *Triple-Digit* Oil Prices

BY PHILIP K. VERLEGER, JR.

Most think tanks and government experts predict a price decline in coming decades. They're dead wrong.

The global economy has experienced wrenching change in the twenty years since the first issue of *The International Economy* was published. The Soviet Union collapsed, Mexico experienced a second debt crisis, the currencies of four Asian countries collapsed, and many economic customs were drastically altered following the September 11, 2001, terrorists attacks on New York and Washington.

Oil markets experienced even greater turmoil. Supplies were disrupted when Iraq invaded Kuwait in 1990. Production in Russia collapsed following the Soviet Union's disintegration. The Asian financial collapse brought crude oil prices back to 1973 inflation-adjusted levels, devastating industry investment. The war for Iraq's liberation may have permanently immobilized perhaps 5 percent of

potential global crude production capacity. Hurricanes indiscriminately shut oil and gas production as well as refining capacity. Uncertainties regarding future global warming regulations delayed needed investments in additional capacity. Spreading nationalism in countries endowed with 70 percent of known hydrocarbon reserves further frustrated global efforts to boost supplies.

The chaos has led to very volatile day-to-day, month-to-month, and year-to-year oil price fluctuations, as can be seen from Figure 1. This graph charts oil price movement from 1987, when the first issue of *TIE* was published, to the end of August 2007. Within a year of *TIE*'s appearance, prices dipped to \$10 per barrel, a level most experts thought had been banished forever. Famously, in 1979 Daniel Yergin and Robert Stobaugh assured

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the public of the certainty of higher prices, stating “higher real oil prices seem assured for the future, with the only questions being how soon and how high.”¹

Less than four years later, the world confronted very high prices once more when Iraq invaded Kuwait. But again, the high prices were transitory as crude collapsed to \$10 per barrel in late 1998 after the Asian and Russian financial crises.

The energy price cycles experienced during *TIE*’s first twelve years occurred because the world’s energy industry had excess capacity. This capacity was used to moderate price increases associated with supply disruptions such as Iraq’s invasion of Kuwait or the suspension of exports from Iraq following the Gulf War.

Today the situation has changed radically. Global demand has grown dramatically with China’s emergence, while capacity expansion has lagged. This makes Yergin’s 1979 statement more plausible. Prospects for a prolonged period of lower oil prices in the coming decades are very low absent a severe recession or depression. Indeed, looking forward, it appears that triple-digit oil prices may become a regular feature of the global economy within three or four years, and soon the first digit may become something other than one. Without drastic changes to energy policies, oil-exporting countries that only eight years ago earned less than \$200 billion per year may realize annual revenues as high as \$2 trillion.

Six factors drive the change in the global energy system: economic growth, underinvestment, nationalism, investment uncertainty, nationalism in coun-

tries endowed with resources, and scale. First, global economic growth would boost energy and particularly oil use at near-record rates if supply were available. Second, twenty years of underinvestment have created supply constraints that make it impossible to meet growing demand. Third, spreading nationalism in countries holding the largest reserves of easily accessible oil and gas further worsen the supply problem. Fourth, needed investment in private-sector capacity expansion is being discouraged by uncertainty created by efforts to reduce global warming gases. Fifth, supply will be limited by conflicts in oil-exporting countries. Finally, efforts to substitute away from hydrocarbons or to conserve will be hampered by the problem’s enormity. The stage is set for a period of very high energy prices.

RAPIDLY EXPANDING DEMAND: THE KEY

The rate of demand growth for energy, as well as the rate of growth for petroleum products, provide the key to the energy price outlook. The growth in energy consumption, in turn, is tied to the “intensity” of use. Many, if not most, projections issued by think tanks and government organizations over the last decade anticipate a decline in use in the coming two decades. These projections are carefully formulated and often elegantly presented. However, in most cases they are blind to history and, for that reason, likely wrong.

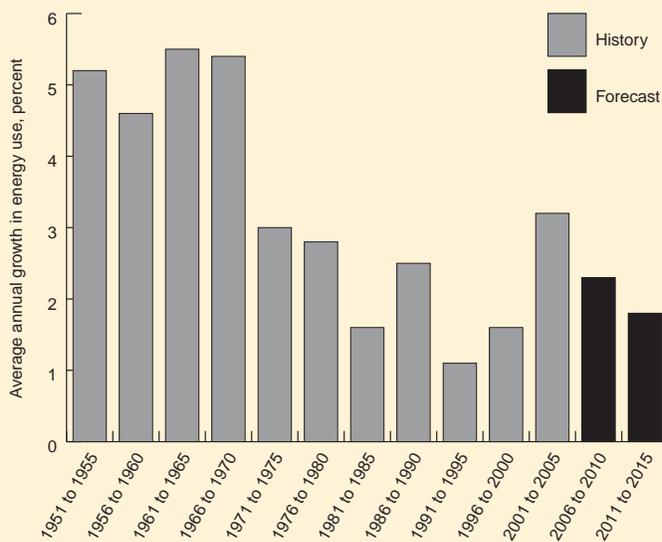
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**Figure 1 Oil's Wide Ride:
Spot Price of Dated Brent Crude from October 1, 1987,
to August 31, 2007**



Source: BP Statistical Review of World Energy (June 2007).

**Figure 2 Increase in World Energy Consumption, 1951 to 2005,
and projected to 2015**



Sources: Energy in the World Economy (see text), BP Statistical Review of World Energy; IEA World Energy Outlook.

The problem that confronts economists is a lack of data. The history used by forecasters starts in 1965 or later. For example, the earliest data presented in the most widely used source book on energy, the *BP Statistical Yearbook of World Energy*, begins in 1965.

Unfortunately by starting with 1965 data, analysts miss the link between strong economic growth in emerging economies and energy use. Data are available though for the entire post-war period thanks to extensive research at Resources for the Future. These data reveal that the pattern of consumption was different in the fifteen years after the war. Figure 2 illustrates this point. There I show growth in world energy consumption for five-year intervals from 1951 to 2005 and International Energy Agency projections to 2015. Note that energy global consumption grew at 5 percent per year from 1951 to 1970. This rapid growth occurred simultaneously with the economic reconstruction in Europe and Japan after World War II, as well as the postwar growth in the United States.

History may well repeat from 2001 to 2020 as China, India, and other countries move from developing to developed nations. Consumption can be expected to increase at a pace close to the rate of economic growth in these nations, just as it did in Europe, Japan, and the United States following the Second World War. While proponents of conservation and alternative energy may assert that intensity of use is declining, the fact remains that infrastructure is energy-intensive. Construction of infrastructure seems to be the dominant feature of countries moving from third world to industrialized status.

The growth in energy demand is unlikely to be affected much by price increases. While energy use is sensitive to price fluctuations, it is more sensitive to changes in income. A review of the hundreds of good econometric studies of energy demand reveals that income elasticities are almost always three, four, or as much as six times as large in absolute terms as the price elasticities. As a general rule, I have observed that prices must rise by 3 to 5 percent for a 1 percent growth in GDP to hold use constant.

THE SUPPLY CONSTRAINT

Rising demand need not equate to rising consumption, however. Demand measures what consumers want. Consumption measures what consumers get after supply and demand balance. Consumption increases are likely to be modest because the global energy industry probably will not have the capacity

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to produce the volumes of “commercially consumable” energy forms demanded by consumers at today’s prices. As a result, prices must rise.

These constraints on the supply of commercially consumable energy such as gasoline, diesel fuel, electricity, and natural gas have only recently become apparent. This spring the problems became apparent in gasoline and diesel fuel markets. In coming months, they will also affect other fuels such as natural gas and electricity. Supply squeezes will be evident in the United States, Canada, Europe, and Asia. Short- and long-term remedies will be hard to find. Instead, markets will resolve the problems.

In 1950, the world did not face such a capacity squeeze. Easily obtainable resources had been identified but not developed. International oil companies exploited them in a timely fashion. At the same time, ships and refineries were readily built, in part because industrial capacity previously directed to war production could be quickly converted to peacetime use. Today we have no surplus fabricating capacity.

The absence of complexity in processing also eased capacity expansion. An analogy to the airframe industry explains the evolution. In 1950 refineries were relatively simple, rather like the DC3 or DC6 airplanes that revolutionized air transportation. Today, refineries and oil field projects are very much like the Concorde supersonic jet, extraordinarily complex facilities that require years to build and great care to keep in operation.

In this cycle, then, the growth in capacity and supply of petroleum and natural gas will be much smaller than in the past. Price increases will substitute.

NATIONALISM

Plans to boost global oil and natural gas supplies between 2007 and 2027 will be additionally frustrated

by the growing nationalism in oil-exporting countries. Today between 70 and 85 percent of the world’s resources are off-limits to the integrated oil companies that have the skill to bring them into production rapidly.

Years ago, the economist David Teece suggested there was a “backward bending supply curve of oil from OPEC.” Recent events seem to confirm his conjecture as the fraction of the reserves taken off the market seems to rise with prices. Over the last five years, we have seen western companies dismissed from Russia, Venezuela, and now Kazakhstan. The displacement of these firms by national companies further slows capacity expansion.

Mexico offers an excellent illustration. Private companies were pushed from that country almost a century ago. Today, Chevron and its partners have discovered a large reservoir in the Gulf of Mexico at a depth of ten thousand feet. Mexico also owns substantial deep-water reserves in the Gulf near its border with the United States. The Chevron partners are spending billions to develop the oil, initiating production in 2007. The Mexican reserves remain undeveloped because PEMEX, the country’s state oil company, lacks the skills or resources it needs for the task. Recently, experts suggested the country would not be able to begin exploration on its property for at least a decade.

GLOBAL WARMING UNCERTAINTY

Uncertainty regarding how governments will reduce greenhouse gases further limits capacity investments. In the last year, executives of one major oil company very publicly explained they would not add refining capacity in the United States despite record margins, arguing that government ethanol mandates could soon make new capacity superfluous. Other companies in Europe and the United States are quietly following the same strategy. For example, buyers of TXU, an electric utility in Texas, canceled plans to build six coal-fired power plants because they expected the facilities’ useful lives to be truncated.

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This underinvestment will leave the United States, Europe, and other areas short of capacity. Further price increases will be required to balance supply and demand.

Ironically, those worried about global warming have missed this point. In his truly excellent report on climate change, Sir Nicholas Stern suggests that investors may need to be discouraged from investing in plants with high greenhouse gas emissions because they cannot be operated for normal useful lives. Recent developments suggest he need not worry regarding investors in the United States or Europe.²

GLOBAL CONFLICT

Prospects for energy supply and stable prices are further clouded by likely global conflicts. During the first twenty years of *TIE*'s publication, global energy markets have been roiled by two wars (Iraq's incursion into Kuwait and the 2003 invasion of Iraq), the Soviet Union's collapse, and peaceful revolution in Venezuela. In each case, the supply of oil and/or natural gas from the country experiencing the disruption was affected. Russia's production dropped almost 50 percent, while output from Kuwait and Iraq fell 90 percent. Output from Venezuela has been down as much as 30 percent.

Over the next two decades, we must expect similar disruptions. Output from Iran may be depressed by United Nations sanctions or the result of attacks on the country's nuclear facilities. Output from one or more other Gulf countries could be depressed by revolution, as could production from Nigeria. A serious earthquake could shut in crude from Alaska.

Many writers have noted that hydrocarbons tend to be produced in geologically and politically unstable areas of the world. Supply interruptions must be expected.

Those projecting relatively stable, if high, oil prices for the next two decades assume there will be little surplus capacity by 2012 or 2013 if all announced investment plans proceed according to schedule and even if programs to displace conventional energy proceed at projected rates. Much higher prices almost certainly will be required to balance markets.

SCALE PROBLEMS WITH ALTERNATIVES

Politicians, planners, officials in industries adversely affected by high energy prices, and many others have called for rapid development of alternative fuel supplies as well as the introduction of new consumption technologies. Legislatures across the globe have adopted mandates that require increased use of alternative fuels. Often the targets are higher than those

unbiased observers with extensive experience in the sector believe achievable. President Bush's proposal to increase ethanol use to 20 percent of the U.S. gasoline pool by 2017 is an example of such a mandate.

These efforts are unlikely to succeed because the resources required to achieve the goals are not available. Most of the projects create demands for skilled labor and fabrication capacity that do not exist and cannot be created in a timely fashion. As noted above, investments in projects to produce conventional fuels such as gasoline will not be made by traditional suppliers, further exacerbating the gap between consumer demand and global capacity.

CONCLUSION

The International Economy began publication following fifteen years of economic tumult that included two recessions, the introduction of flexible exchange rates, and the default of a number of third-world countries on debt taken on after the first oil shock. Rates of economic growth during *TIE*'s first twenty years were far more stable thanks to the skillful exercise of economic policy tools. Prospects for a further decade or two of stable, strong economic growth are good if the world's central bankers demonstrate the discipline they have shown over last two.

Energy prices rising from current levels will be one consequence of the skillful management of global economics. Growing economies demand more energy. Prices must climb to reduce this demand if supplies are not available. Today there is little prospect for the increased supplies called for by economic expansion for a number of reasons, including those cited above.

The good news is that rising prices probably will not affect growth adversely. The world, as we have discovered, can live with rapidly increasing energy prices. To see this one need only note the better than 4.5 percent annual rate of growth from 1999 to 2006 at a time when crude prices rose by 800 percent. The challenge for policymakers will be to manage the wealth transfer—or alter it through taxation. In 1999 a group of exporting countries that included OPEC, Mexico, and Russia earned roughly \$200 billion from their exports. In 2007, their annual revenues may reach \$1 trillion and by 2012 they may surpass \$2 trillion. ♦

NOTES

1. Roger Stobaugh and Daniel Yergin, *Energy Future* (New York: Random House, 1979), p. 4.
2. See *The Economics of Climate Change: The Stern Review* (Cambridge, England: Cambridge University Press, 2007), p. 205.