PROPERTY/CASUALTY INSURANCE

OIL SHORTAGES: THE NEXT KATRINA?

The possibility of future disruptions in the supply of oil is real and growing. Insurers may be affected in many ways — with implications that are as significant as the costs from Hurricane Katrina.

By Gail E. Tverberg

In his recent State of the Union address, President Bush called for reduced dependence on foreign oil. The last G-8 economic summit meeting included oil supply as a major agenda item. Oil prices have been volatile as global production strains to meet demand. Is there a serious threat of future oil shortages, or will alternative energy sources be developed in time? How does this affect insurance companies?

Oil is a major commodity that drives much of the world's economy. Customers of insurers, both businesses and individuals, are highly dependent on an adequate supply of oil. If a major oil shortfall should occur, insurers, like their customers, are likely to be affected in many ways — including changes to the risks underwritten, investment losses and adjustments to internal operations. The extent of the impact will depend on the timing of the shortfall, the stage of development of numerous alternative energy sources and company preparedness.

RISING DEMAND AND UNSTABLE SUPPLIES

According to the U.S. Energy Information Administration (EIA), worldwide oil demand is expected to grow almost 2% a year between 2005 and 2025 — over 40% in just two decades. With consumption in China and India growing rapidly, other nations can expect to take a thinner share of whatever can be produced in coming years. In the case of a shortfall, oil-producing nations may choose to meet their own needs first, adding to the gap for oil-importing nations.

Much of the oil produced today is in countries that are politically unstable or in deep-water locations vulnerable to hurricanes. Infrastructure is stretched thin, with minimal extra refinery capacity and little redundancy in oil pipelines and other transportation. Given these manifold uncertainties, the potential for short- and long-term disruptions is both real and growing.

With only a finite amount of oil and natural gas on earth, at some point the amount of extractable oil (and natural gas) will start to decline. Researchers disagree sharply as to the date when this decline will begin.

With adequate planning, new sources of energy will be found to replace lost oil production and thus lessen the impact of reduced supply. The pricing mechanism can also be expected to bring supply and demand into better balance by encouraging both additional production and conservation. If shortages are severe, governments may intervene with price caps or rationing.

DECLINING DISCOVERIES

Exhibit 1 shows the history of oil discoveries by 10-year periods. The high point is the discovery of the large Mideast oil fields about 1960. Every 10-year period since then, the amount of oil discovered has declined. Discoveries are progressively fewer and smaller, despite increased exploration efforts driven by rising prices. Oil company mergers, share buybacks and a continuing failure to build new refinery capacity suggest that the oil industry itself may share this pessimism about finding new oil.

In most oil sites, production starts at a low level, gradually rises to a peak and then starts to drop off once the easily obtained oil has been extracted (see *Exhibit 2*). The time between discovery and peak varies, but with advanced drilling techniques, it can be as little as 15 years.

Peak oil production in the United States excluding Alaska came in 1970 — about 40 years after the major discoveries. Alaskan oil reached its peak production in only 20 years, and the North Sea in about 25 years. Production has similarly peaked in over 50 oil-producing countries throughout the world. Production has not peaked in a number of OPEC countries and in several states that were formerly in the Soviet Union.

ESTIMATING THE PEAK

If the U.S. pattern of peak output 40 years after discovery held worldwide, the world peak in production would already have been reached, given the big discoveries about 1960. In estimating a peak, the major question is how soon production in the Mideast will begin to decline. For many years, the conventional wisdom has been that the region has huge reserves, enough to last for the foreseeable future. This belief is now being questioned since Mideast reserve estimates are unaudited and some recent research suggests they may be overstated.

Current estimates of when oil production will peak range from very soon to about 2040. U.S. government projections and oil company estimates tend to be at the latter end of this range. Several researchers

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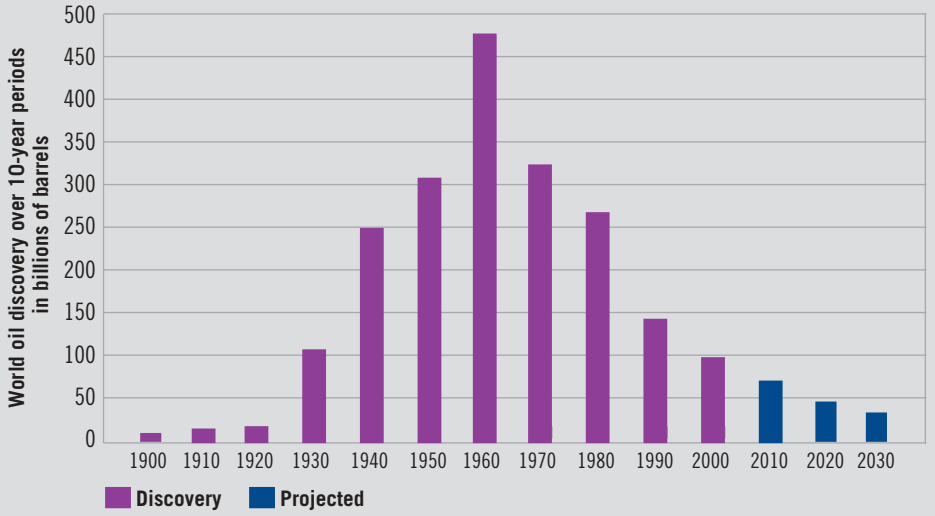
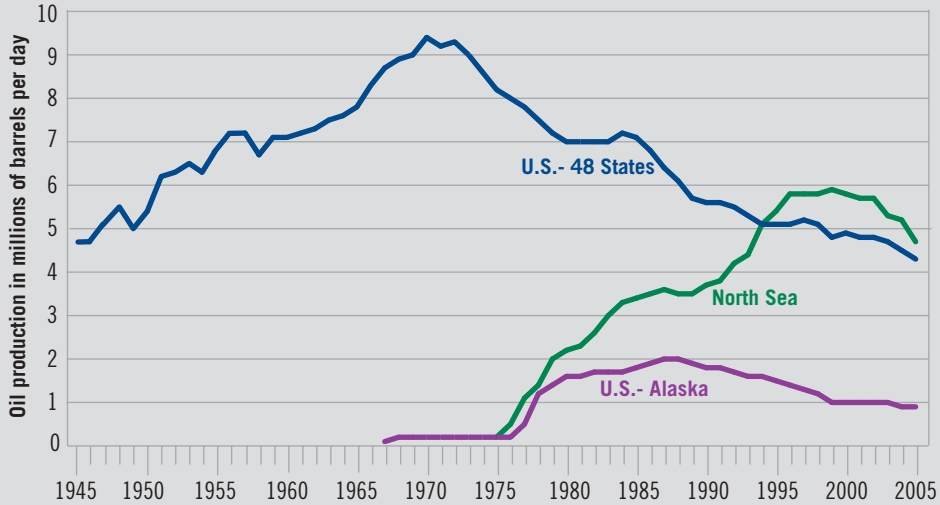
EXHIBIT 1
World oil discoveries are declining



Source: Uppsala Hydrocarbon Depletion Study Group, Uppsala University, April 2005.

EXHIBIT 2
After a peak, production generally declines



Source: U.S. Energy Information Administration

believe the peak is imminent and that this is the reason for the current high oil prices. The Association for the Study of Peak Oil and Gas (ASPO) predicts a peak about 2010.

One measure of the consensus view of the financial community and oil industry participants is the forward price curve — the prices that can be locked in today for delivery of crude oil some time in the future compared with current prices. Currently, the price of crude oil delivered six years from now is about $3 less than crude delivered next month. This relationship suggests that some industry participants are comfortable with the near-term supply and demand balance, albeit at near-record prices.

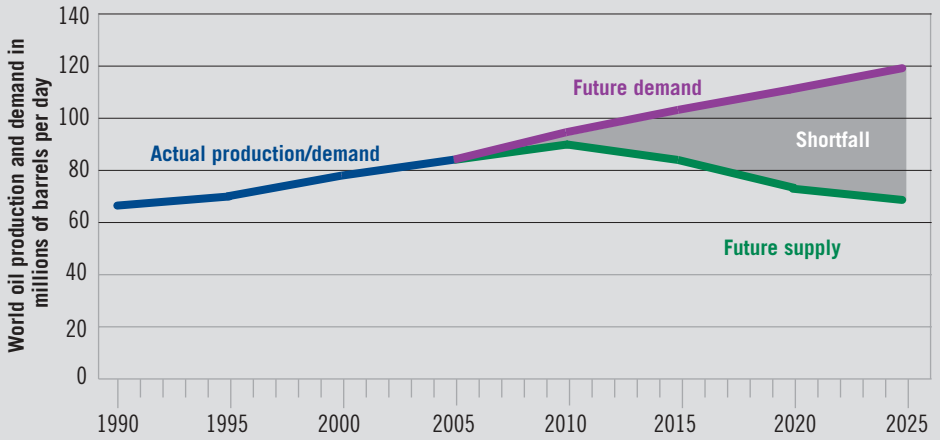
Once a peak has been reached, *Exhibit 3*, on the next page, shows how a shortfall can grow rapidly over time if nothing is done to alter the basic demand assumptions. Questions arise as to whether future demand can be reduced through conservation or other means and whether alternative energy sources can be developed to fill the gap.

IMPLICATIONS FOR INSURERS

What does all of this mean from an insurer's perspective? The outcome depends to a significant extent on how soon the oil peak comes and how much preparation is made in advance. If the peak in oil production is still more than 20 years away, and an all-out effort is made in the interim to develop alternative energy sources, there may only be a few short-term disruptions similar to the patterns seen in the 1970s,

To make up for the eventual decline of oil and gas as energy sources, whole new industries will emerge or expand to meet society's needs.

EXHIBIT 3
World oil shortfall may grow



Sources:
World Oil Production: U.S. Energy Information Administration.
Future demand: Reference Case — International Energy Outlook 2005 – U.S. Energy Information Administration.
Future supply: Projections by The Association for the Study of Peak Oil & Gas, April 2006.

including spurts of inflation, less driving caused by shortages of fuel, a shift by consumers to smaller vehicles and home heating disruptions. These impacts disappeared when the supply resumed.

If there is a long-term mismatch of supply and demand, there is likely to be greater discontinuity, and the economy may take new directions. We need to understand the risks and decide whether there is a need to prepare for some of the more adverse scenarios.

New Industries

To make up for the eventual decline of oil and gas as energy sources, whole new industries will emerge or expand to meet society's needs. The U.S. has built no new nuclear power plants in almost 40 years. Any expansion brings new risks. The development of terminals and ships to transport liquefied natural gas will add highly explosive structures, potentially close to populated areas.

Many of the alternative fuel industries are hardly more than experiments at this time. If the huge amount of oil currently used is to be replaced, astronomical growth will be needed. The property/casualty insurance risks associated with these new industries will grow just as rapidly. Insurers that take on these new risks will need to be extraordinarily nimble to properly price and underwrite these new exposures.

Existing Products

Just as important as properly evaluating new risks will be discerning changes affecting existing risks. As new industries replace old ones, there will be layoffs and possibly bankruptcies among existing businesses. These could affect workers compensation claims and bond guarantees. Disruptions relating to energy supply may trigger business interruption coverage.

There may also be new types of toxic torts that emerge. A medical examiner in Alberta recently reported a high number of illnesses (including leukemia, lymphomas and autoimmune diseases) in a community near where oil sands are being extracted. If oil produced in the future includes a higher level of pollutants than in the past, this could increase both workers compensation and liability claims.

In personal lines, the models using past experience will need some imaginative supplements as well. The auto manufacturing industry has demonstrated the ability to bring new products to market in record time — three years or less — so the insurance industry needs to be just as nimble in evaluating any shift in car mix.

If gasoline becomes very costly, living in outlying suburbs may become less attractive. Oversized homes, wherever located, may become expensive to heat and maintain. Prices of these homes may fall and they may become difficult to sell. Homes may stand empty for extended periods. Costs for goods that need to be transported, including food, could experience large increases.

Could an industry with $500 billion in premium volume lose $50 billion (10%) in a single year from sudden oil shortages? It

Alternative Energy Sources

What are some of the alternative energy sources that may be developed?

■ **Oil sands and oil shale.** Plentiful, but rate of extraction is very slow with current technology. Expected to contribute only a small fraction of total oil production in the next 10 years.

■ **Coal.** Plentiful, but not as easily portable as gasoline. Increased use may exacerbate environmental concerns.

■ **Natural gas.** Has some of the same supply issues as oil, since it is often found alongside oil. It is already in short supply in North America and Great Britain. Significant infrastructure is needed for importing gas, and it is not a direct substitute for gasoline.

■ **Nuclear power.** Requires long lead times, has radioactive waste disposal issues and relies on a nonrenewable resource (uranium).

■ **Ethanol.** Can be produced from sugar cane, corn, switch grass and other plants. Large-scale substitution for gasoline would mean taking productive farmland away from food production, limiting the extent of its application.

■ **Improved batteries.** Could lead to electric cars and trucks powered by electricity from coal, nuclear or other sources. Electric golf carts are currently widely available. More research is needed for fast, long-distance vehicles.

■ **Solar, wind and wave energy.** Each has the potential to cover part of the shortfall, but all these sources start from a very small base.

■ **Hydrogen fuel cells.** Technology is still at a developmental stage. Commercial production of vehicles with this technology appears to be at least 20 years away.

seems quite possible. A surge in inflation and the accompanying upturn in interest rates would amount to a triple blow in the form of investment losses, underwriting losses and additions to reserves to settle claims. The combined effect could easily outstrip the one-year cost of Hurricane Katrina for the U.S. insurance industry.

Other Effects

The operation of insurance companies could be affected as well. Sharply higher gasoline costs and diminished supply could greatly increase the use of carpooling and telecommuting. Changes to the physical plan of companies may also be needed.

On the investment side, there is likely to be just as much disruption. Interest-rate surges will result in lower bond market values, and increased bankruptcies may add to capital losses. New businesses may present opportunities for stock market investment. Stock market volatility may be high in an uncertain environment.

All of these conditions accelerate the need for more formal enterprise risk management systems with a wider variety of scenarios considered — especially one with a sustained worldwide shortfall in oil supplies.

While the laws of supply and demand will generally explain what will happen to oil and gas prices, the changes could be more dramatic than logic would predict. There could also be attendant worldwide political problems if conflicts arise over who gets the largest share of the existing oil supply.

WHAT CAN INSURERS DO NOW?

■ Stay up to speed on this issue; e.g., review some of the Congressional testimony on this subject, such as:

www.cleanpeace.org/images/Hirsch.pdf

www.globalpublicmedia.com/transcripts/589

www.peakoil.net/Publications/Jim SchlesingerTestimony111605.doc.

There is also an excellent report entitled "Peaking of Oil Production: Impacts, Mitigation, and Risk Management" by Hirsch, Bezdek and Wendling (February 2005) that was prepared for the U.S. Department of Energy.

The U.S. Army has also studied this issue. Its report is "Energy Trends and Their Implications for U.S. Army Installations" by Fournier and Westervelt (September 2005).

■ Set up internal committees to consider expected impacts and possible variations. This would include underwriting and investment aspects, as well as internal effects on employees and the physical operation of running the company.

■ Start looking at the potential for using the company's own claim data with predictive modeling techniques to get better insight into the expected impacts. These techniques can anticipate turning points in data sooner and can analyze experience for smaller segments of coverage that are expected to be affected to a greater (or lesser) extent than other segments.

Clearly, oil and natural gas supplies are an issue of tremendous importance to the insurance industry and the world. It is not too early to start planning for the dramatic changes that may occur.

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