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A FUTURE WITHOUT OIL?

The cost of living will go up.
Your clients' plans will have to change.

Oil platform dislodged
by Hurricane Katrina



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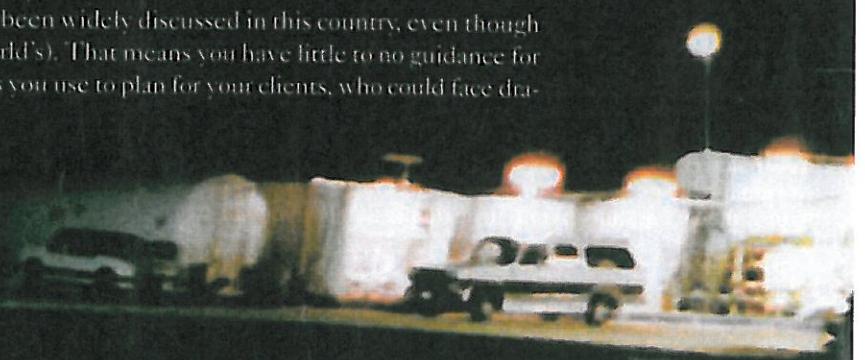
E N E

Even before Hurricane Katrina savaged oil and gas facilities on the Gulf Coast, experts were concerned that we're running out of oil—and will face a drastically changing economy. Here's what you need to know.

By Richard Vodra

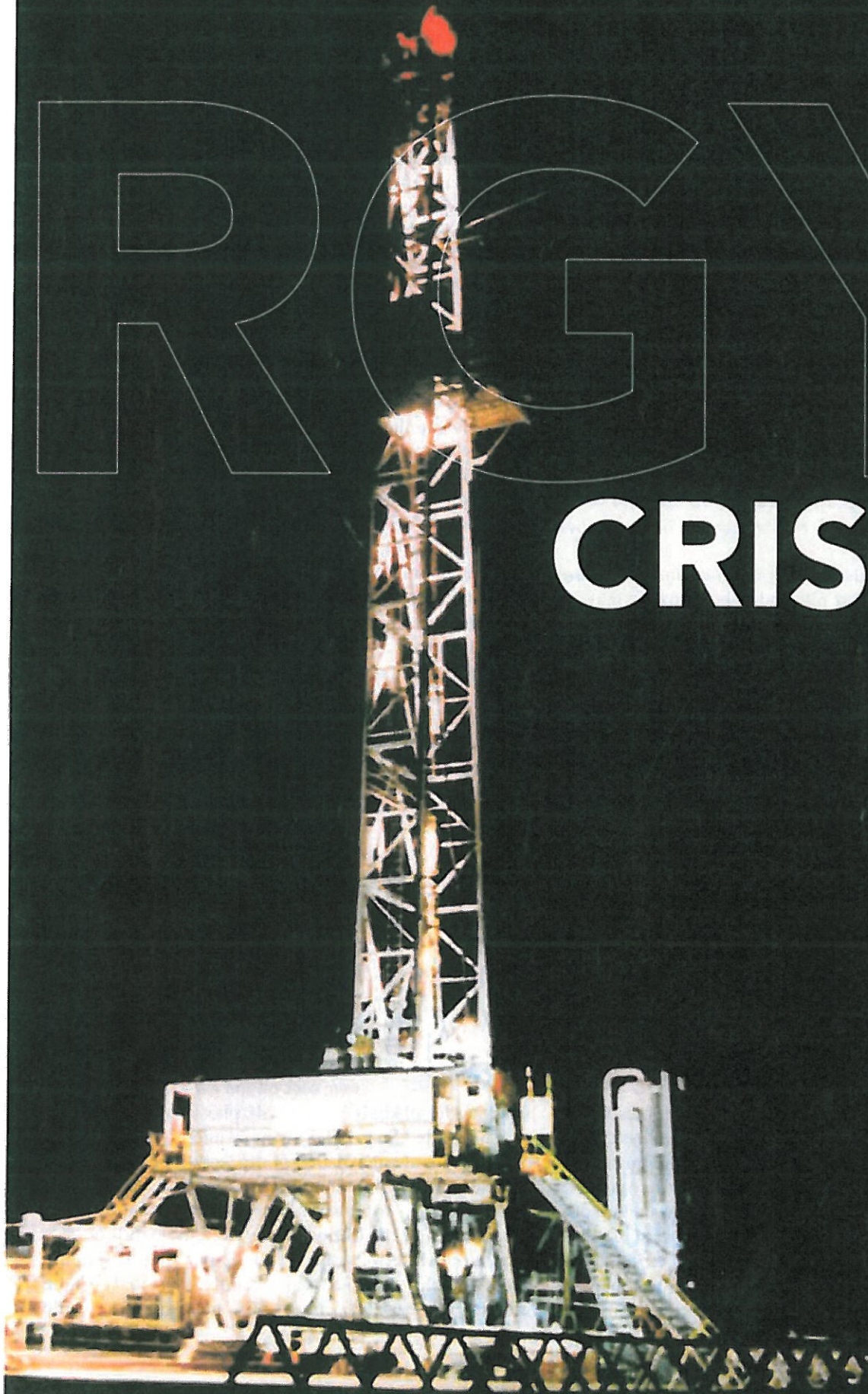
Have you heard about Peak Oil yet? The idea—that the world is maxing out on its ability to produce oil and will soon be faced with a dwindling supply—is capturing the popular imagination. The Peak Oil concept is now being discussed in academic circles, in books and in cover articles for reputable magazines such as *National Geographic* and *The New York Times Magazine*. The recent devastation of oil facilities along the Gulf Coast by Hurricane Katrina (and the accompanying spike in energy prices) has added urgency to the conversation. When the final tally is in, how much oil will we have lost? Is it possible for the world to be running out? Will we never see \$2-a-gallon gas again? Dwindling oil reserves could change almost everything about the material way people live on this planet.

For all its importance, Peak Oil has not yet been widely discussed in this country, even though oil is the lifeblood of our economy (and the world's). That means you have little to no guidance for interpreting how it might effect the projections you use to plan for your clients, who could face dramatically rising fuel costs in their lifetimes.



REGY

CRISIS



Diminishing oil supplies could be considered a variable that, like inflation, should be part of a judicious financial plan. A client's choice of where to live, whether and how to commute and what kind of housing to own could all potentially be affected by the economic effects of scarce fuel. Peak Oil is a complex and controversial topic, and this article is designed mainly as an introduction. If you prepare your clients for the possibility of Peak Oil, they can choose whether and how to respond.

WHAT DO YOU MEAN, NO MORE OIL?

Most people believe that the amount of oil in the world is finite, and that we've found most of it. No huge fields have been discovered since the North Sea in the 1970s, and the world's annual production has exceeded annual discoveries for more than 25 years. On a cumulative basis, we have pumped almost 1 trillion barrels of oil, and estimates of the earth's total recoverable oil are about 2 trillion barrels or a little more. This would suggest that we could be close to Peak Oil now. If the world's total supply of oil is 3 trillion barrels, then peaking would occur when we've produced about 1.5 trillion barrels, or in another five or six years.

At the same time that some geologists and petroleum experts are warning that oil-production capacity may be topping out, world demand for oil is increasing at a rate between 1.5% and 3% per year. Right now, the world pumps about 84 million barrels of oil a day, or more than 30 billion barrels a year.

It's useful to understand how people get oil out of the ground. Many of us have a mental image that oil wells are like gas stations, sitting above caverns (or tanks) filled with oil that can simply be pumped out at will. In fact, oil

Many of us think that oil wells are like gas stations, sitting above caverns that can be pumped out at will.

deposits (which may include gas and sometimes water) usually fill the tiny holes in sandstone or other rock. Once the initial pressure is released (think of the gushers in the old movies), pumping begins at a rate that matches the flow of oil toward the well. As the flow slows, additional techniques can push additional oil toward the well, or horizontal drilling can expose more rock to the intake pipe. Each barrel of oil is a little harder or more expensive to get and some of the oil can't be recovered at all. Pump-

ing too fast or neglecting proper maintenance can accelerate output in the short run, but at a steep cost in ultimate recovery. (It is feared that lack of proper maintenance in Iraq's oil fields will make much of that country's reserves lost to future production.) Anyone who has tried to drink a Slurpee quickly through a straw knows that you rapidly reach a point where nothing comes out until more energy (heat) is added to your cup. Petroleum energy is much more complex, but the image might be helpful.

With today's technology, it becomes harder and harder to get oil from a deposit once about half its reserves have been tapped. Peak production typically occurs at that halfway point, whether for a well, a field, a country or the whole world. Most oil-producing countries—including the U.S.—have passed their date of peak production. Even Indonesia, a member of the Organization of Petroleum Exporting Countries (OPEC), is a net importer of oil now. The only supplier of conventional oil that claims excess capacity these days is Saudi Arabia, and at some point that country, too, will reach its peak. Alternative sources for oil (such as deep-water wells) may eventually come on line, but they do not appear to be plentiful enough to offset the decline in conventional reserves.

It's likely that we will be able to identify the date of Peak Oil only in retrospect. Monthly production fluctuates and emergencies confuse the data. (In 2004, Hurricane Ivan took 500,000 barrels per day out of production by severing an underwater pipeline that took six months to repair. In August, Hurricane Katrina knocked out some refineries and production facilities for weeks, if not longer. As of mid-September, Gulf Coast oil and gas facilities were operating at about 60% of capacity.) I expect that Peak Oil will be more like a plateau than a "peak," but even a plateau would entail increasing shortages when compared with rising demand.

THE ENERGY ECONOMY

Since the use of fossil fuels became widespread in the 1700s, the world's wealth has grown explosively. Coal, oil, gas and electricity have enabled developed nations to devise more efficient transportation, food production and an all-around better quality of life. In addition, coal, oil and gas have been the raw

materials for all kinds of chemicals, plastics and fibers.

The United States uses about 20 million barrels of oil a day, which is about a quarter of the world's production. We get most of our oil from North America (the U.S., Canada and Mexico); we also import major amounts from Venezuela and the Middle East. World demand for oil is increasing at between 1.5% and 3% per year. If supplies are available, demand is projected to reach 120 mbd around the year 2020. That's 50% more than the world



Storm waters flooded these petroleum storage tanks near Mobile, Ala.

produces today. Much of the increasing demand is from China and India. So far, the oil producing countries have been able to keep up with demand. The question is, how long they can continue.

While Peak Oil will be a global problem, this discussion focuses on its impact on the United States and what Americans can do in response and anticipation.

Two-thirds of the oil used in the U.S. is converted into fuel for transportation. Only about 3% of transportation in this country is powered by electricity. While a few types of vehicles have been converted to electric or hybrid power, no one has designed an electric airplane or a solar-powered bulldozer.

Thus, if we have an oil shortage, we have a transportation and distribution crisis. The spread of our cities, suburbs and exurbs has gone forward under the assumption that we could rely on cars—and cheap gas to power them. Just-in-time manufacturing and the globalization of production assume that trucks, trains and ships will be able to move parts and products with ease. We depend on cars and buses to get to schools, offices and hospitals. We once built compact cities that relied on walking or electrically powered buses and trains (like New York City and Boston), but as soon as workers could afford cars we chose another path.

A second major use of oil—about 25%—is as the raw material for the chemical and plastics industries. Petroleum is an ingredient in everything from pesticides to carpets, and the packaging these products come in. When the U.S. endured oil shortages in the 1970's, one of the first scarcities to become evident was raw materials for chemicals and plastics.

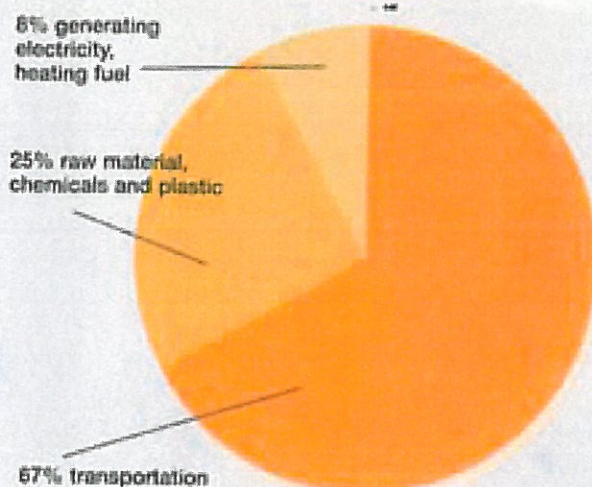
The balance of oil is mostly used for generating electricity (only about 3% to 5% of electricity produced comes from burning oil) or heating homes (especially in the Northeast).

FUEL FOR FOOD

From a different perspective, about one-third of all the oil and gas in the U.S. is used for food production in one form or another. Farmers use diesel-fueled tractors to spread oil-based pesticides and gas-based fertilizers on fields watered by central-point irrigation systems connected to electric pumps, then harvest the grain, ship it (by trucks, trains and barges) to feedlots for fattening chickens, cows and pigs, or to factories for creating processed food that is then packaged in plastic, frozen (more electricity), shipped to warehouses or grocery stores and restaurants, sold to people, cooked and ultimately disposed of in landfills along with all the wastes created at every step of the process. It is estimated

THE ENERGY ECONOMY

How the United States makes use of oil



that 10 calories of energy from oil go into every food calorie consumed. It is further estimated that the average food item travels 1500 miles from the farm or feedlot to get to the consumer.

Another major user of oil is the military, from the fuel for tanks and airplanes and ships to the feeding of personnel and the upkeep of military bases around the world. Since one of the main missions of the American military is securing the flow of energy to our country, much of the defense budget could actually be considered a component of energy costs.

WHEN COULD PEAK OIL OCCUR?

Some experts believe that we reached Peak Oil late in 2004. The Federal Energy Information Agency projected in April 2005 that worldwide demand for oil would exceed production by 700,000 bpd by the end of 2005, although the ultimate peak would come later. The Association for the Study of Peak Oil and Gas (ASPO), a European network of scientists, currently projects a peak in 2007. Matthew Simmons, Colin Campbell and Kenneth Deffeyes, three independent experts in the field, have each projected Peak Oil dates from 2006 to 2010. The official position of the U.S. Geological Survey, on the other hand, is that peaking will not occur before 2030; and the major oil companies are projecting dates after 2015.

As financial planners, we should not take too much comfort in the prospect of peaking taking place in 2020 rather than 2006. Our profession tries to help our clients take a long-term perspective on their lives. We want people who are 30 today to save for their retirement in 2040 and be prepared to enjoy that retirement for decades. A first-grader today will still be in college in 2020. We have an obligation

to shape our plans to reflect the world our clients will live in, and that includes the world after Peak Oil. Thus, under any of these projections, Peak Oil could be imminent, certainly in terms financial planners understand. The question is how to calculate the changes in our clients' lives.

Peak Oil does not mean that oil will suddenly be unavailable at any price, but prices will certainly go up. The most immediate effect will be stagnation in the amount of oil available on the world market, and then supplies will gradually fall. ASPO projects that world production will fall from 84 million bpd today to 80 million in 2010 and 70 million in 2020. However, 84 million bpd today is 100% of demand, while 80 million in 2010 is only 86% of projected global demand and 70 million in 2020 is less than 60% of projected demand. Those are real shortages.

Can't we just find more oil? The problem is that no "elephant" fields have been found worldwide since the early 1970s, and not for lack of looking. We shouldn't rely on discovering another Saudi Arabia or West Texas-sized field in the next few months. Even after finding a field, it takes many years to bring it to production. (If the controversial Alaskan National Wildlife Reserve field were approved for production this year, for example, the first oil could not be pumped until 2013 to 2015. The maximum projected production for the field would only be about 1 million bpd—in 2020.) Developments are being pursued in West Africa, the Caspian basin and elsewhere in the world, but these improved reserves are already factored into current projections.

At this point, you may be thinking that I've forgotten about the power of technology and the markets to alleviate shortages. Surely, more efficient technology and alternative energy sources will mitigate the impact of peak oil. Right now, unfortunately, the short-term options are not attractive.

In a study done for the U.S. Government in February 2005, Michael Hirsch of SAIC examined a number of alternatives in the transportation fuels area. Can we reduce demand by improving gas mileage for our cars? Yes, but slowly. Can we manufacture liquid fuels from coal? Yes, but it would take at least four years for the first plant to open, and 10 years before production reached 5 million bpd. Can we produce fuels from heavy oil and oil sands? Yes, there are resources in Venezuela and Canada that could be developed to perhaps 8 million bpd in 10 years, but no serious output would be available in less than three years. Can we turn natural gas into diesel fuel? Yes, with a new, very expensive process. If all of these technologies were pursued today, at full speed, overriding environmental laws and other licensing problems and finding the capital somewhere, they would have little impact for at least five years. They could be meaningful in about a decade.

What about solar-powered electric cars? Mass transit?

Windmills and geothermal energy? Won't higher prices generate more innovation and a large reduction in demand? If Peak Oil is coming in a few years, the alternatives we know about today won't push it back very much. If we have a decade or more to work with, and we start pursuing alternatives aggressively, the worst effects can be avoided or minimized.

HOW CAN YOU PREPARE FOR PEAK OIL?

It is possible that this Peak Oil is an empty threat, like Y2K—something to keep alarmists up at night. But even if this is so, bear in mind that preparations for Y2K served the U.S. well in a later emergency, the terrorist attacks of 2001. Despite serious damage to electric, phone and data lines in lower Manhattan, the vital financial information generated there was never endangered.

Likewise, it can't hurt us to prepare for Peak Oil. In the worst case, we'll have spent some money to develop alternative energy sources while oil remains plentiful. That's hardly a disaster, and could even have positive economic consequences.

As financial planners, we are trained to focus on financial issues. The first response to a trend or event is usually, "What should people invest in to take advantage of this?"

Higher prices for oil will represent real transfers of dollars that will recycle through the world economy and could continue to fuel low interest rates and high asset prices. (The four-fold increase in oil prices since 1999 has corresponded with high global growth, not a collapse, and that could continue.) It is likely that direct ownership of natural resources, especially energy and possibly precious metals, will be a good investment if there is an energy shortage and general disruption. But these areas are traditionally volatile and risky.

The fact is, of course, that economic prediction is difficult always, and market predictions are more difficult, even in regular times. We've never had a Peak Oil situation before. The impact is that risk has to be considered to be increased from normal levels. Whether potential returns may be higher or not is uncertain. Clients should be informed of these risks.

So what financial investing advice should you offer? One idea is to have an updated conversation about risk and time horizons with clients who are concerned about Peak Oil. Another is to suggest that clients decrease debt and increase liquidity to reduce their level of personal risk. Too many people are seriously overextended now and lack the cash reserves to weather dislocations and higher energy prices. A third strategy could be to increase

exposure to energy and related areas in your clients' portfolios when appropriate. Where to go beyond this, in terms of asset allocations, sector weightings and geographic diversification, needs to be affirmatively addressed by each planner.

CREATING A NEW KIND OF VALUE

As financial planners, we commonly describe what we do as helping our clients use their financial resources to live the lives they want. We are often the only people talking about a client's dreams, plans, constraints and how to fit them into a practical, real-world plan.

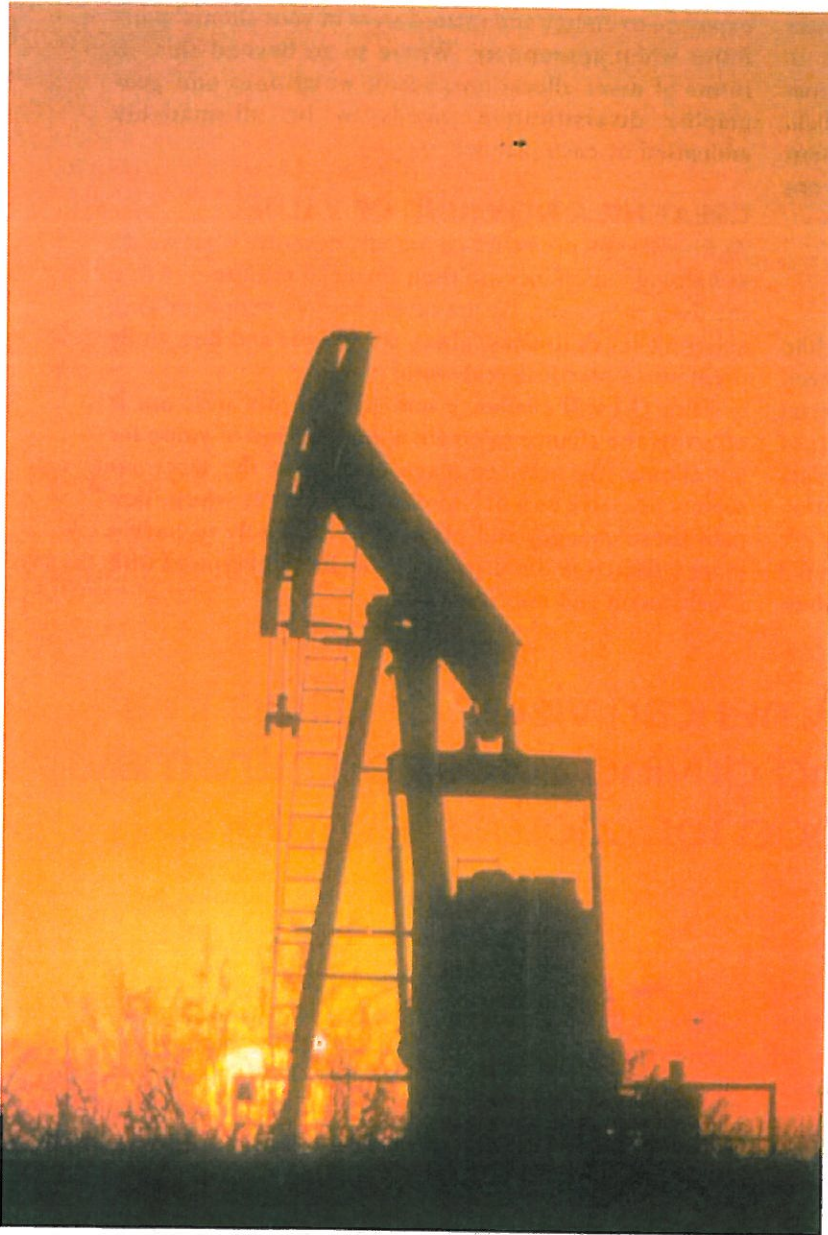
Peak Oil will challenge our skills in this area, but it offers us the chance to create a unique kind of value for our clients. We may see major changes in the ways our society operates on a day-to-day basis. People who anticipate these changes and plan ahead are likely to have a more satisfactory life than those who merely respond with shock, anger and improvisation.

The American vision of piling in a car and driving across country may be good for another few years.

As this article has repeatedly pointed out, Peak Oil will most immediately create problems with transportation. Food supplies will become less reliable and raspberries flown in fresh from Chile will likely disappear from our stores. Gasoline will at best become more expensive and may simply become less available at any price, discouraging casual commuting and shopping. Everything moved by trucks—which is to say, everything we buy—will be more expensive. Chemicals, plastics and millions of consumer products will become more expensive, less available or redesigned.

One response is to structure life to require less energy, and especially less gasoline. Advise clients to share rides to work or shopping and to telecommute whenever possible. They might also downsize cars or purchase hybrids (unless they get too expensive relative to their gas savings). Getting a bicycle will improve both their finances and their health.

Another smart suggestion is to make capital expenditures today that will reduce utility bills in the future. By acting now, clients can take advantage of high asset prices to raise cash. They can augment the insulation in their homes and install solar panels or geothermal systems where feasible. Planting trees can add cooling shade.



Will oil pumps, like this one in Odessa, Texas, become relics to a bygone era?

Encourage clients to purchase appliances that conform to Energy Star standards, which are at least 10% more efficient than standard models. Look up all the energy-saving ideas that were recommended in the 1970s and see which ones still make sense.

Clients looking to downsize their housing needs or relocate should do it sooner rather than later, because the demand for large houses may go down when energy costs go up. Relocating near mass transit or to towns where walking is an option could be very useful in the future. Families that are spread across the country may want to consolidate, because flying to visit parents or children for the weekend may become difficult and expensive.

If a client is thinking about a major vacation, recommend taking it now, not later. International travel may become much more expensive, and if international tensions continue to increase (as nations try to grab whatever energy resources that they can), travel could become practically impossible. The American vision of piling into the family car and driving across the country may be good for another year or two, but could be much less popular in a decade than it is now.

Taking care of one's health will be ever more important in the future. Healthcare providers are heavy users of chemicals and plastics, creating another reason for medical costs to rise further in the future. As labor-saving devices (like cars) become more expensive, we will all use more human energy to do things, but that requires strong underlying health.


The bottom line is that much will change, but not in a disastrous way. We will have the opportunity to create or rebuild local communities and the massive consumption that we both enjoy and decry will gradually diminish. Since the perceived level of happiness in the population today is no greater than it was in the 1950s—when per capita GDP was less than half of current levels, we can clearly adjust to this challenge in a healthy way.

When we ask our clients what they think is really important, the answer is rarely in terms of "more stuff." Even today, virtually no one has enough money to own or do all the things they want. The terms of this discussion are changing, and the price and availability of "stuff" may be about to change dramatically and permanently, but our clients can still use their financial resources to create lives of real meaning and value.

Peak Oil may create a huge shift in the way all of us look at daily life and the future. It will not be easy or painless, either physically or psychologically. America has always based its prosperity on a generous supply of cheap natural resources—forests, farmland, gold, coal, oil and more—and we believe that we will always be entitled to that birthright. How Americans transition—and how we as planners help in that transition—will shape our society for the twenty-first century and beyond.

FP

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