



Peak Oil is Coming: No, Really!

A top consultant advises Toyota that peak oil looms.
But will demand destruction take the “peak” out of peak oil?



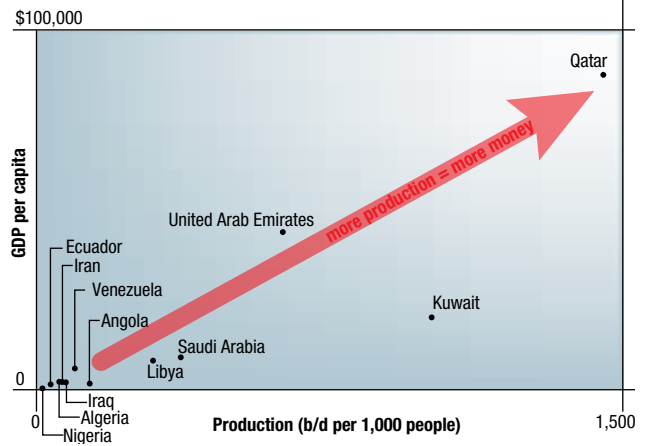
Customers fill their tanks at a gas station in Seattle. Gas prices extended their advance toward record levels

Given the news from the past few months, it borders on the foolhardy to preach about the looming dangers of peak oil. Doing so seems a bit like warning about the possibility of drought while standing without an umbrella in the midst of a torrential downpour.

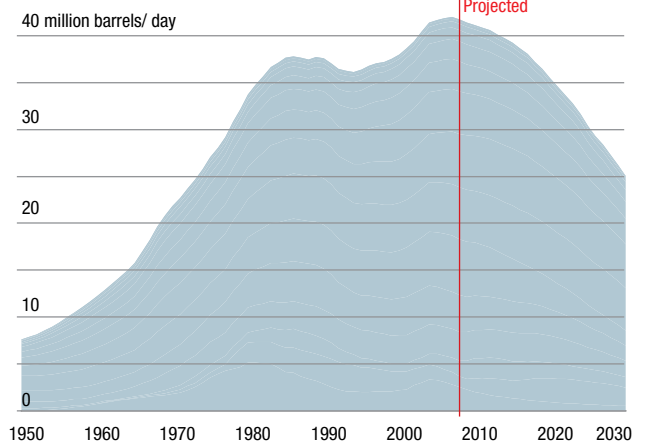
Indeed, the price of oil has plummeted from its July peak of \$145 per barrel (for West Texas Intermediate at Cushing, Oklahoma) to under \$80 by early October. The price collapse coincides with a big drop in oil demand. The Energy Information Administration now expects that U.S. consumption will fall by 4 percent this year. And credit-card issuer MasterCard estimates that gasoline demand during the first week in October fell by 9.5 percent compared to the year-earlier period. Indeed, it appears that the demand destruction associated with the rapid run-up in oil prices has for the moment obliterated all talk of oil going to \$200 in the next year or two, or three. Over the longer term, the key question appears obvious: will demand destruction take the “peak” out of peak oil? (I’ll come back to that in a moment.)

The prospect of \$50 oil looms. OPEC is in disarray. The Saudis have made it clear that they will defend the price that suits them, not the prices that Hugo Chávez wants. After

Population and wealth



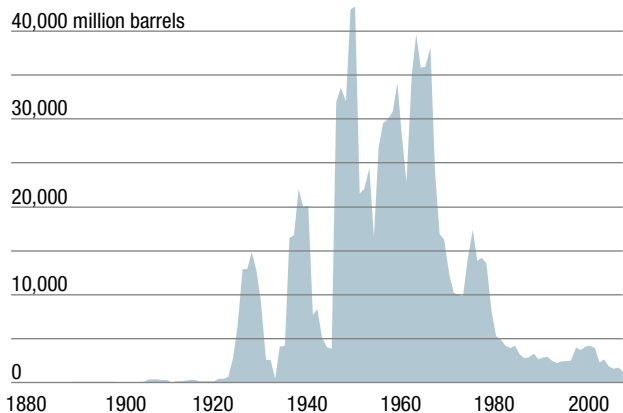
Non-OPEC production at peak



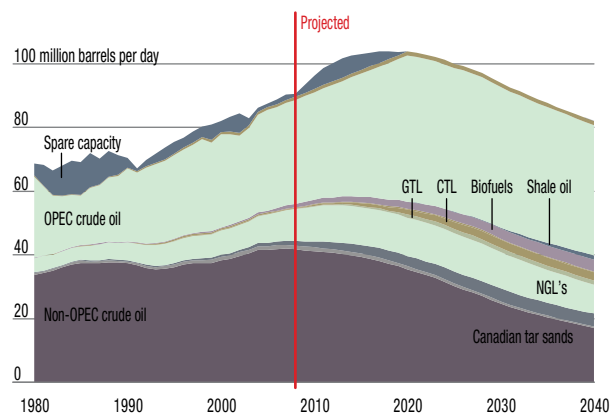
all, they are spending tens of billions of dollars to bring on new spare capacity while the Venezuelans have essentially decided to sit on their hands and plunder PDVSA for as much cash as they can. Further, according to the latest projections from the International Energy Agency, Saudi Arabia will add 1.78 million barrels per day of new capacity by 2013. The Saudis are eager to get a return on their multi-billion dollar investments in the fields at Shaybah, Nuayyim, and Khurais.

All of these factors have led to a stock price collapse for essentially all oil and natural gas companies. Between mid-September and early October, shares in Chesapeake Energy, one of the biggest U.S. independents, fell to less than \$17, from \$40. During that same time, Exxon Mobil fell to just over \$62, from \$75.

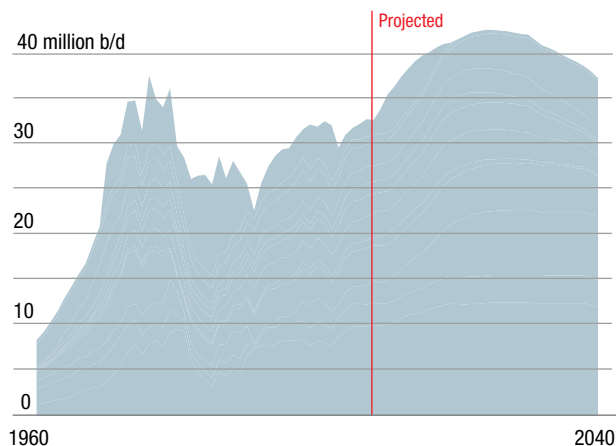
OPEC discoveries peaked 40 years ago



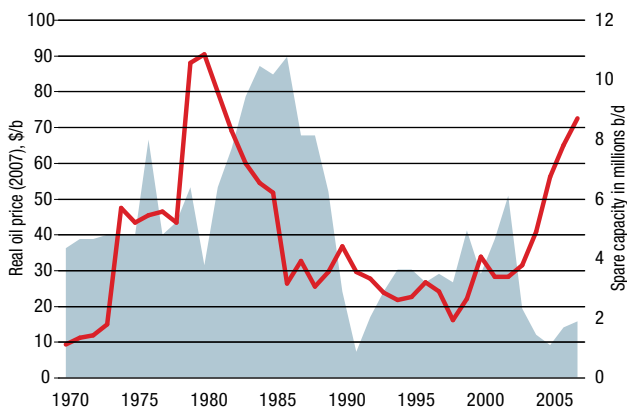
Well's peak liquids production prediction



OPEC production capacity forecast



Peter Wells comparison of oil price and spare capacity



And yet – and yet – some of the best minds in the energy business insist that this latest bear market is only baiting the trap for a huge price run-up that will likely come around 2015. And – despite all of the current turmoil – they may end up being right.

Before going further, I readily admit that I have, for several years, had a rather flippant attitude toward peak oil. When asked my opinion, I would generally respond: so what? My rationale being, we will only know that we've hit peak oil when the event has actually passed. And second, regardless of prices or supplies, we will only move away from oil when something else comes along that is cheaper/cleaner/more convenient, or all of the above. Thus, I've long felt that all the fretting about peak oil has been largely misplaced and that even if the peak were imminent, there would be little that the U.S. or any other country could do to avoid the difficult energy transitions that are looming.

That said, I've spent a good bit of time over the past couple of months talking to two of the sharpest analysts in the oil business: Peter Wells and Charley Maxwell. And both are convinced that peak oil is real, it's coming, and the pain that will accompany its arrival will be severe.

Who are these guys? Wells has a Ph.D. in geology and three decades of experience in the global oil industry. He has worked extensively in the Middle East, Russia, West Africa, and Europe, and is an expert on the oil politics and geology of Iran and Iraq. He spent 12 years with Shell International, 4 with BP, and 6 with LASMO, the British oil and gas independent, where he led the company's business development efforts in the Mideast, including Iran. In 2001, he helped start NefteX, a British oil consulting firm. Since 2005, he has been a consultant to Toyota, developing world oil supply and price forecasting models. I have known Wells since 2005 and heard



Motorists and motorcyclists line up outside a gas station selling rationed fuel in Kathmandu, Nepal. Shortage of fuel in Nepal prompted by strikes and protests in the south forced the shutdown of much of the capital's public transportation system

him speak several times. His presentation on September 23 during a “sustainable mobility” seminar sponsored by Toyota in Portland, Oregon motivated me to write this piece.

Maxwell has been in the oil business for more than 50 years, beginning with a stint at Mobil Oil in 1957. In 1968 he began working as an energy securities analyst. Since 1999, he has been a senior energy analyst at Weeden & Co., a brokerage in Greenwich, Connecticut. Now 76 and showing no signs of slowing down, Maxwell has become one of the most quoted analysts in the business. In the September 8 issue of *Barron's*, Maxwell predicted that due to ongoing demand growth, and lackluster supply additions that include the new Saudi fields at Khurais, Shaybah, and Nuayyim, the price of oil will reach about \$300 per barrel by 2015. I have heard Maxwell speak several times since 2002, and talked to him at length on September 25, when he summarized his view of the future by saying, “We have gone on an unsustainable energy course.”

Of course, there is a multitude of other analysts who've been studying peak oil and making dire predictions, including Colin Campbell and Kenneth Deffeyes.

What sets Wells apart from the pack of alarmists is that he has done the deep and dirty analysis of individual field production data. In fact, Wells utilized field output info supplied by Denver-based consulting firm I.H.S., which owns one of the world's most extensive oilfield databases. This same field-by-field data was utilized in 2006 by an I.H.S. subsidiary, Cambridge Energy Research Associates (CERA), to come up with their study on future global oil production, which claimed that global output could reach an “undulating plateau” of 130 million barrels per day by 2030. The study concluded that the peak oil argument “is based on faulty analysis which could, if accepted, distort critical policy and investment decisions and cloud the debate over the energy future.” The study also claimed that the remaining global oil resource base is about 3.74 trillion barrels.

Wells took the same data and came up with a far different conclusion. He estimates that global liquids output will peak in about 2015 at no more than 100 million barrels per day. And that's when things will get very interesting for automakers like Toyota and, of course, for the rest of us.



Multinational Oil Companies and their Expected Peaks

Company	Production Peak
Total S.A.	2010
Shell	2006
BP	2010
Exxon Mobil	2011
Conoco Phillips	2008
Chevron	2011
ENI	2008

Source: John S. Herold Inc., 2006

Non-OPEC Countries: Past Their Prime

Country	Peak Year	Annualized Depletion Rate
U.S.	1970	1.2
Mexico	2004	2.5
Norway	2000	3.6
U.K.	1999	4.9
Oman	2000	3.4
Argentina	1998	2.0
Egypt	1996	2.6
Colombia	1999	3.9
Australia	2000	4.4
Syria	1996	2.7
Gabon	1997	3.1

Source: E.I.A., Weeden & Co.v

As China, India and others grow their economies, demand is outstripping the oil industry's ability to find new reserves.

Wells's work on peak oil began in 2003, which led him to publish a piece in the *Oil and Gas Journal* in 2004. Looking back at that initial work, Wells says that his prediction at the time was that the peak in global liquids output would likely come at a level of about 95 to 110 million barrels per day, somewhere between 2020 and 2035, "depending on OPEC reserves and OPEC's willingness/ability to invest in new capacity." When he began his consulting work for Toyota in 2005, Wells decided on a "bottom up" approach using the I.H.S. database and NefteX's own data for the U.S. He then disaggregated all of the potential sources of oil – conventional crude, NGLs, tar sands, shale oil, biofuels, coal-to-liquids, etc. – so that he could look at their growth potential on a segment-by-segment basis. The I.H.S. data included field-by-field information as well as production information for the former Soviet Union, the U.S., all of the OPEC members, and all non-OPEC producers.

Among his most important conclusions is that non-OPEC production is peaking this year. That is in line with analyses done by the E.I.A. and by John S. Herold Inc., on the non-OPEC producers and the major international oil companies (Tables 1 and 2).

During his presentation in Portland, Wells said that the world is near the halfway point with regard to oil reserves. That is, we have produced about 1 trillion barrels of oil and there's about 1 trillion barrels

left to produce. But the problem is that new discoveries are not keeping pace with demand. "World peak exploration success was hit in 1960," said Wells. Today, as countries like China, India and others grow their economies, demand is outstripping the oil industry's ability to find new reserves to feed that demand. And that can be seen by looking at spare capacity. In the mid-1980s, the world had a peak in spare capacity, with some 10 million barrels per day of excess production capability. Predictably, that spare capacity led to a price collapse that persisted until the first years of this century, a period during which, according to Wells, the floor price of oil was largely set by the spending needs of the Saudi government. Today, and for the foreseeable future, supply and demand will be in much tighter alignment, with Wells seeing excess capacity growing slightly this year and next to about 2 MMbbl/d.

The tight spare capacity exacerbates several other factors. The peak in non-OPEC production means that future production must come from OPEC members.

photo by Esteban Felix: AP



A protester pulls a burning tire along the Pan American highway during a demonstration against the energy crisis in Managua

That's a problem. Saudi Arabia stands alone as the player with the resources, technical skill, and desire to increase production in a meaningful way in the near term. The other major OPEC members with big resources – Iran, Iraq, Venezuela, Kuwait, and Nigeria – all face political constraints that will limit their ability to add large increments of new production.

Of course, if those political constraints were removed, the issue of peak oil would probably be forgotten for another 20 years or so. Wells believes that Iraq could eventually produce 7 MMbbl/d, but that level won't be reached until at least 2020, due to the obvious obstacles: political wrangling, violence, and the lack of technically savvy personnel who can manage large new exploration and production projects. Iran, Venezuela, and Nigeria could likewise ramp up production, but all are beset by political regimes that have little interest (or ability) to dramatically increase output for the export market. Wells predicts that Iran may be able to increase its output to about 5.5 MMbbl/d, but not much beyond that.

There are other impediments that go beyond the OPEC/non-OPEC divide. And readers of *ET* will find them familiar: lack of manpower, increasing prices of steel, and increasing costs for fabrication, purchase, and maintenance of all types of oilfield machinery and installations. Of course, none of these factors will matter if oil demand continues to fall. That doesn't appear to be likely.

Destruction Demand

History shows that sharp increases in oil prices are often followed by recessions. Those recessions typically lead to sharp decreases in oil demand and therefore, prices. The most obvious example of that slackening demand occurred after the sharp price increases of the late '70s and early '80s. Those prices reached about \$98 per barrel (in 2008 inflation-adjusted dollars) in January 1981. In 1978, U.S. oil consumption averaged 18.8 MMbbl/d. It stayed below that level until 1998, when it hit 18.9 MMbbl/d. That period of slack

demand was accompanied by a sustained period of low prices. From the mid-'80s through the early '00s, prices largely stayed under \$20 and even fell as low as \$9.39 per barrel (\$12.57 in 2008 dollars) in December 1998.

Today, we have similar slackening of demand due to higher prices. For instance, in July 2008, consumption was 19.4 MMbbl/d, substantially below the all-time high of 21.6 MMbbl/d in August 2005. Furthermore, U.S. oil demand has been falling nearly every month since December 2007.

So will demand destruction take the peak out of peak oil? While it's tempting to answer in the affirmative, several factors appear to show that it will not. Before going to those factors, let's look at the forces that could lead to slower demand growth. They include, most obviously, a sustained recession. If world economic growth stalls for a sustained time, oil demand will continue to be slack. Second, automakers are working hard on hybrid vehicles and electric cars that could slow gasoline demand. Third, new tougher efficiency standards for U.S. automakers, combined with ongoing additions of billions of gallons of corn ethanol into the gasoline pool, will likely further dampen U.S. gasoline demand. (Note, however, that decreasing gasoline demand will not necessarily mean lower overall oil consumption, as refiners will still have to refine crude in order to produce diesel, jet fuel, and other products.)

Even so, there are major differences between the current situation and the conditions that existed in the '80s and '90s. First and foremost is the paucity of spare production capacity to be had. (See chart on page 25) Further, there are far fewer oil producers with big reserves remaining to be tapped. As shown in Table 2, 10 different oil-producing nations peaked between 1996 and 2004. Those producers will not be able to add significant amounts of new crude production to the global market.

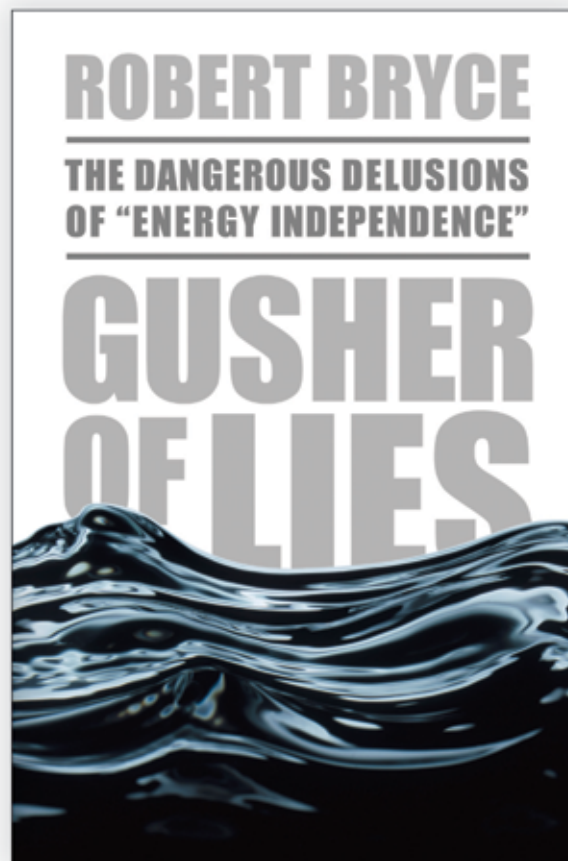
Perhaps most crucially, in decades past China and India were largely still on the sidelines. That's no longer the case. According to an October 7 report from the E.I.A., China's August crude oil imports jumped by 12 percent, while its oil products imports increased by 32 percent, over the year-earlier period.

Of course, it's not just China. Other developing countries, like India, Vietnam, Malaysia, and Indonesia, are also rapidly increasing their energy consumption. And much of that is focused on transportation. In July, the I.E.A. estimated that the total number of motor vehicles could increase to as many as 1.2 billion by 2013, from the current 800 million. While a very small percentage will run on electricity, natural gas, or other alternatives, the overwhelming majority will be fueled by refined petroleum products.

Additionally, any future increases in OPEC output, particularly among the Persian Gulf members of the cartel, could be directed toward internal use. Energy demand in the Persian Gulf is soaring. According to the latest BP Statistical Review, in 2007, oil consumption in the Middle East grew at the same rate – 4.3 percent – as did

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—Matthew Simmons,
Simmons & Company International,
and author of *Twilight in the Desert*



“The shallowness of the energy independence rhetoric, empty of science, blind to the dramatic shrinking of the world, is brilliantly exposed in Robert Bryce’s incisive—and readable—and important *Gusher of Lies*.”

—Sir Harold Evans, author of *They Made America*

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—Mark P. Mills, writer of the *Forbes* column “Energy Intelligence,” and co-author of *The Bottomless Well*

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demand in China. That increasing oil demand is a reflection, in part, of the region's growing electricity demand. In 2007, power generation jumped by 4.7 percent in the Middle East. For comparison, power use in North America grew by 2.4 percent. And as the Middle East continues to industrialize, it's reasonable to assume that its energy demand will continue rising apace.

Peak oil will not be as damaging to the U.S. and other developed countries as it will to the less-developed world.

In 2006, Dermot Gately, an economist at New York University, analyzed the energy consumption patterns within OPEC. Last year in *The Energy Journal*, Gately concluded that growing demand within OPEC members could mean that 40 percent to 50 percent of the cartel's total output could be consumed internally by 2030, thereby "constraining OPEC's ability to increase oil exports." Gately wrote the rest of the world "should not rely upon OPEC's export-share of non-OPEC demand remaining constant. We might not even be able to count upon OPEC being able to maintain its level of oil exports."

Data from Saudi Arabia, the world's biggest oil producer, backs up Gately's thinking. According to the E.I.A., Saudi oil production increased by 8.9 percent between 1997 and 2007, growing to 10.2 MMbbl/d from 9.4 MMbbl/d. But during that same time, internal consumption jumped by 67.3 percent, to 2.31 MMbbl/d from 1.38 MMbbl/d. The result: net Saudi oil exports during that decade fell, albeit slightly, about 80,000 bbl/d.

So what does all this mean?

Perhaps the best single point was made by Maxwell, who said that peak oil will not be as damaging to the U.S. and other developed countries as it will to the less-developed world. Why? Because higher oil prices will mean "rationing by price." That is, the wealthier countries and consumers will be more able to afford motor fuel that costs \$5, \$10, or even \$15 per gallon. Consumers in poor countries will be unable to compete for fuel at those prices. And that could create serious social problems. Wells largely agrees with this outlook, saying, "Rising prices will drive demand destruction and the development of new technologies to make much better use of supply." He goes on, explaining in a recent e-mail, "This will be painful and potentially fatal in the really poor countries of the world where access to fuel for generators, fertilizers, transport, etc., will mean risk of famine/starvation/reduction of the capacity of nations to provide basic services."



Indian women dry cow dung cakes for use as cooking fuel in Phoolpur village, about 45 kilometers (28 miles) east of Allahabad, India

photo by Rajesh Kumar Singh: AP

Of course, consumers have long had rationing by price for other commodities, such as Rolex watches and Mercedes cars. But the rationing of a commodity that is so crucial to modern society could have dramatic negative effects on billions of people around the world. After all, some 2.5 billion still use biomass – dung, wood, straw, etc. – for their home cooking needs. If they are completely priced out of the market for hydrocarbons, they will be destined to continue living in dire poverty.

But Wells and Maxwell, and the many other analysts who have been predicting peak oil, could still be proven wrong. Given the cyclical nature of the commodities sector and the recent slump in oil prices, it is foolish to make huge bets on oil prices. Furthermore, as the ongoing financial crisis seems to prove, no one knows anything. Forecasts and models are handy, but markets – and of course, prices – are inherently chaotic. A prolonged recession or a depression could choke world oil demand to the point where a peak in production matters little. And of course, other technologies could come along that could allow significant substitution for oil.

But inventors and investors have been searching for an alternative to oil for decades, and they have yet to find anything that approaches the flexibility and versatility of crude. The sudden oil price drop may result in a corresponding investment decline in alternative energy technologies. The punch line seems obvious: consumers around the globe will be relying on oil for decades to come. The unanswerable question is equally obvious: how much will that oil cost in 2015, 2020, or 2030?

If Wells and Maxwell are right, and I'm increasingly inclined to believe that they are, the U.S. and the rest of the world would be well served if they began taking steps to ameliorate the potential disruptions that will come from the oil price shocks that are looming large on the horizon. **ET**