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## listeningin

# Running On Empty?

*Matt Simmons Makes Case That Oil "Reserves" Aren't Much Of A Cushion*

*It was the morning of Dec. 22, 2005, and not a creature (who didn't absolutely have to) was stirring in a New York City in the throes of a transit workers' strike, when I caught up with Houston investment banker and author **Matthew R. Simmons**—not in any of his usual energy patch haunts, but at his Maine home, where he'd just arrived for the holidays. We'd agreed to talk (and eventually did) about his literary cause-celebre, *Twilight in the Desert, The Coming Saudi Oil Shock and the World Economy* (John Wiley & Sons, Inc.), the book that last year shook the world's complacent assumptions about the Saudi's claims of huge oil resources. We also explored the response to his peak oil arguments and what Matt sees happening next. But first our chat turned to other energy-tinged topics du jour. Go ahead, eavesdrop. **KMW***

**You're a hard man to catch up with these days. I won't be able to publish this until after the holidays, but I understand you're going to be even harder to find, somewhere in the Caribbean, for the next few weeks.**  
That's right. And I was concerned you wouldn't call because you were trapped somewhere by the subway strike.

**No, thankfully. I'm sticking to my New Jersey office to avoid traffic nightmares. If the transit union thinks this strike will endear its members to the public, it's sadly mistaken.**

It's rather like that Vietnam-era general said, isn't it? "We have to destroy the city to save it."

**It has been 25 years since the last transit strike in NYC. So it took a generation for everybody involved to forget what an unmitigated disaster it was and let the hot heads have their way. Granted, the labor movement has barely budged since Reagan fired the air traffic controllers, so were probably overdue to see the pendulum swing the other way. But I can't see the strikers generating much sympathy, not with the news full of stories about companies renegeing on healthcare and pension promises, not to mention about the fixes GM and Ford are in because of their labor costs.**

There was an interesting program on NPR [National Public

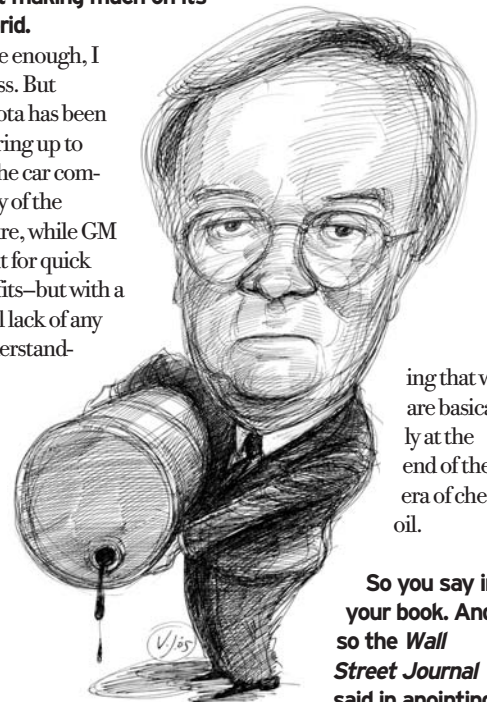
Radio] the other day about the success that **Toyota** and some of the other foreign auto companies have enjoyed in this country, just by maintaining friendly labor relations and avoiding unions. I mean, I don't think that Ford and GM have a chance of making it. Even before oil prices started up, they were doomed because of their pension liabilities.

**They have made a lot of business mistakes, but the worst was not realizing that they couldn't keep promising an endlessly full cookie jar for years and years.**

Particularly while the quality of their products went down and dragged sales down, too. One of the great chapters, as the energy story plays out, was written when General Motors doubled down on the Hummer—at just about the same time that Toyota stepped up production of its Prius.

**Say no more. Though my impression is that Toyota still isn't making much on its hybrid.**

True enough, I guess. But Toyota has been gearing up to be the car company of the future, while GM went for quick profits—but with a total lack of any understand-



ing that we are basically at the end of the era of cheap oil.

**So you say in your book. And so the *Wall Street Journal* said in anointing**

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**Victor Juhasz**  
Page 1 Illustration

**you one of "The Five Who Laid the Groundwork for the Historic Spike in Oil" on its first page the other day [12/20/05]—**

You know, it was so funny to see that because the writer began interviewing me about six weeks ago and I did not have *any* idea what they were planning. He said, "We are going to do a very unusual story," and I didn't have any idea where it was going by the kind of questions he was asking. Then he would come back and ask more questions and I thought, "God, this is going to be an odd story." But when I finally saw it, I thought it was really a pretty spectacular job of piecing together stories about these five totally different individuals into a picture that is kind of representative of the forces that have changed the oil market: Ali Naimi, the Saudi oil minister, who is really basically trying his darndest to create sophistication within OPEC. But, unfortunately, he is dealing with bad data. Then they had that CPA in China who has basically traded his bike in for a car. Then the story of [British Petroleum CEO] Lord Browne, [whose 1998 merger with Amoco sparked Big Oil's *fin de siecle* merger spree]. I mean, the irony is rich. He was worried that BP was *too small*, so the entire industry gets so big that they forget to explore. And that also led the majors, basically, to make the lethal mistake of thinking that cheap oil prices would be around forever. Because by getting so big, they essentially made sure they couldn't survive in a world of high oil prices.

**They did?**

Yes. High oil prices are just an unmitigated disaster for the business model of big oil.

**And you're not referring merely to the PR headaches it brings, I take it?**

No. They actually need low prices—around the \$25 or so a barrel they persist in using in forecasts—to have a reliable business plan. It is very counterintuitive, but once you understand it, it starts to explain why they are so passionate that oil prices are going to come down. The reason is that to the extent that oil prices keep rising, the major oils have to start regurgitating ever higher percentages of reserves already-booked in foreign production deals to their partners.

**You mean their reserves basically revert to their partners after certain levels of revenue are generated?**

Right, the reserves start reverting to Angola or whatever country. By contrast, if oil prices stay relatively low, the majors essentially stand to keep 80%-90% of the projects for themselves. So if you have a field that is coming on stream that is going to produce 100,000 barrels a day for two or three years before it goes into decline, at \$25-\$30 oil, basically you can figure on getting 99% of the revenue, because you won't reach payout over that span.

**But once you do generate a certain level of revenue?**

Generally, once you hit payout, oops, you only have rights to 50,000 barrels a day and a problem—because you have already booked proven reserves, assuming you were going to get 80%. So you are going to have to write them off. Then, even worse for the big oil companies, it is really hard in a high oil price environment to go into a country like Angola and negotiate a really juicy deal—because all of a sudden your partner has money. Finally, the majors have been too big for

some time to grow by the drill bit. So they have had to acquire reserves. It is easy to use your financial clout when oil prices are low because everyone else is maimed. But when oil prices are high, an **Anadarko Petroleum** doesn't want to be acquired. A **Devon Energy** doesn't want to be acquired. So what do you do? You are basically just going into liquidation and there is nothing you can even spend your money on to meaningfully change that. The good projects are very technically demanding but they are too small. The big projects are very, very, very technically demanding and they may take a decade before anything happens. So in the meantime you just pile up an unbelievable amount of money—and become a sitting target for BP's Gordon Browne and for the U.S. Senate and for you name it, Hugo Chavez. So the outlook for the major oils is just terrible. That is precisely why, in my opinion, you have such a resounding loud voice coming out of big oil and insisting that these are unsustainably high prices. Of course, the irony is that their insistence that oil prices have to fall convinces General Motors that it is really still okay.

**Right. Their good buddies who run the big oil companies must know, and would never steer them wrong. Yet you contend that nobody, not even big oil, really has a good handle on global oil reserves?**

Oh Lord, no. First of all, *I* have as data that is as good as they have. That is the other interesting thing: By the way that the majors *talk*, they lead people to believe that they somehow have a database that no one else has. But the one thing that I know a lot about is petroleum data—and it is lousy.

**That's certainly the impression I got from your book.**

Yes. It's so true, unfortunately. What is interesting is that if you go back to the winter of 1999, when oil prices slid down to \$10 a barrel, it was the leadership of big oil who actually encouraged *The Economist* to write that unbelievably bad—and horribly timed—cover story, right at the bottom. The one that said, "We are now going to have \$5 oil for a decade." They actually *believed* that there was a massive glut—even though this was during the unbelievable era of "missing barrels" that the IEA kept talking about because it couldn't ever find the glut in any inventories. In other words, this was just a classic example of an industry that had gotten so large that people weren't actually minding the store.

**Who could be bothered with such nettlesome details, when their real business was managing earnings?**

Yes. Another interesting observation is that 10 years ago, I spent the better part of two hours looking carefully through the UK's Brown Book of field-by-field production statistics. I was preparing a brief overview of what the North Sea was all about for the Aberdeen Oil Show. Well, within about 45 minutes, I started seeing for the first time how rapidly these giant fields in the North Sea were declining, and how the next generation wells basically reached peak production at 40% of the first generation's peak and that the third generation was peaking in about a year—and about five years later were down to 20% of peak production. So I produced this paper that said that between 1998 and 2000, the North Sea would peak. Well, the major oil companies at the same time were presenting data to the International Energy Agency that went into this unbelievable book called "*Global*

*Offshore Oil Prospects to 2000.*” It claimed that by 2000, the UK and Norway would be producing 7.2 to 7.3 million barrels a day and that their production wouldn’t peak until 2010. Now, the 10 companies that supplied that data were the most sophisticated big oil companies in the world. But it turned out that in 1999, the UK and Norway didn’t quite hit 6.1 million barrels a day at their peak. And by next summer, they estimate their production will be down to 3.5 million barrels a day.

**Ouch. Yet the incurable optimists on oil like to point to the fact that, in aggregate, the North Sea has now produced much more oil than anyone ever thought possible when those fields were discovered—and that new wells are still being drilled there.**

Yes, it has. And we *are* basically finding a rabbit here and there. But think about it. How could the majors be *that* far off in their North Sea estimates over that short a period of time? We are not talking about a bunch of third-rate oil companies. Besides, just think, to figure that out literally took me two hours. I just happened to have the time while I was sitting here in Maine and I thought, “Wow!” That was probably my single biggest introduction to the power of the decline curves that modern oil technology has created. Then, if you fast forward to December 1999, I was part of an infamous group at the National Petroleum Council that presented to Energy Secretary Richardson an unbelievably good news report about natural gas. It said basically that we have a market in which consumption is going to hit between 28 and 30 TCF by 2010. But, through advances in oil field technology, as long as we have proper access, we can supply that market and keep the price of natural gas under \$3 through 2015. Now, I argued at the time during our sessions that, “Guys, we are actually bagging the United States. There is not one iota of truth in this report.” What was very interesting was that about 14 months later, 50 of us assembled in Washington to do an update and as we went around the table almost everybody said, “Boy, it is really amazing how well we did.”

**Are you kidding?**

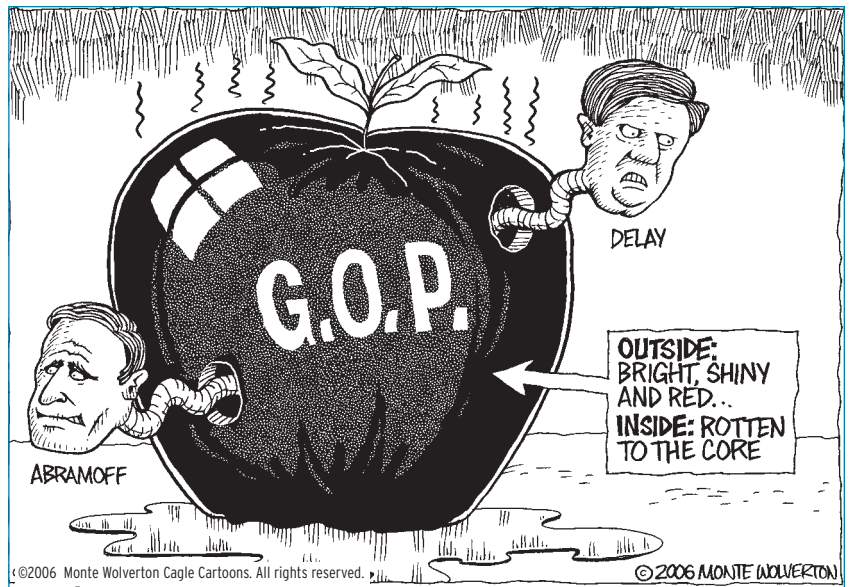
No, I am not kidding at all. I said, “You guys are crazy. Do you remember saying I was just a pessimist? Well, we missed everything.” Even then, it took another 12 months before [Energy Secretary] Spencer Abraham asked the NPC to come back to the table and produce a totally new report. That new report came out in the fall of 2003, and it says, “It looks like we can maintain a steady supply until 2010 and then we will get bailed out by LNG.” But now they are going back to the drawing board and saying, “Well, that wasn’t right, either.” It is astonishing to me that this industry—we are talking about the largest on earth—could be so devoid of hard, realistic analysis.

**Especially because, when the issue is North Sea production or domestic natural gas, you’re talking about reserve bases that are considerably more transparent than anything in the Middle East.**

Oh yes, these are the two most transparent basins in the world. Theoretically, the most sophisticated companies work in those areas. But realistically, I would give the participants in both “quizzes” grades of F-.

**You’re a tough grader. Everything involves estimates in the oil business. There’s no magic instrument anyone can stick in the ground to get an exact reading of how much oil or gas is down there. And by its very nature, the business attracts cockeyed optimists.**

Well, sure, there is a little of that. But you know what? I have been hanging in as a pure energy investment banker for the last 35 years. I am a cockeyed optimist, too. But I am also an analyst and all you have to do is be a bit of an analyst and then be a realist to say, “This analysis, these numbers we have, are actually pretty scary.”



**You mean scary numbers like those you gathered from engineering reports in researching your book? What really seems to spook you is the combination of what can be gleaned about Saudi production with scientists’ reports of problems encountered in getting reserves out of those, or similar, geologic structures?**

Yes. That analytical process, it turns out, works very well in areas where we have a lot of information about production and reserves [like domestic gas]. But it also turned out, that if you are willing to work, it also works in the one area where I believed there was no data [the Saudi fields]. There is actually a ton of data. It was just that it was really hard data to wade through.

**Petroleum geology reports? Any of those technical studies I’ve ever looked at give ordinary mortals like me a migraine in a minute. You must be made of much sterner stuff.**

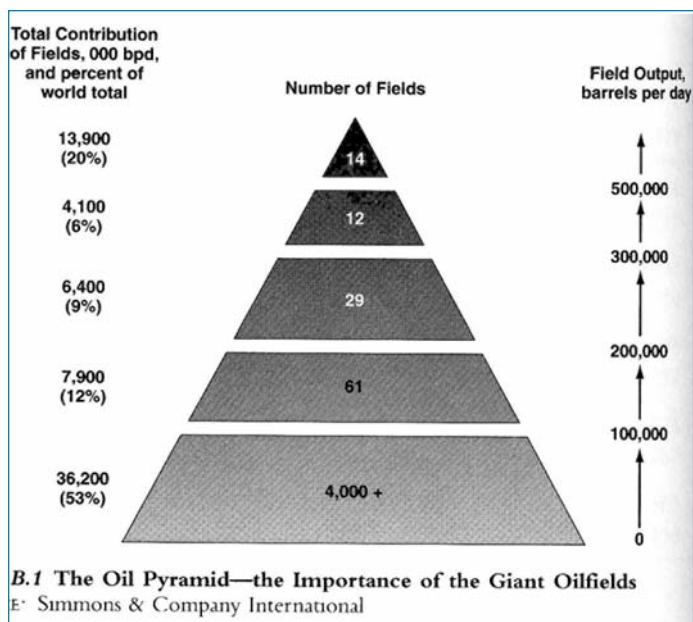
Well, luckily, I didn’t have to try to understand all of their formulas, just some of the numbers. And I went through the reports and underlined phrases like “attic oil” and “going back to pockets of oil left behind in a nearly depleted area.” Those aren’t very hard words to understand.

**The second is self-explanatory. But what is attic oil?**

When they said, “We are draining attic oil,” what they basically meant was that the 500-foot column of oil that was in the formation when it was discovered 45 years ago has now been reduced to what was left behind by the initial recovery process. So that was interesting. So yes, some of the engineering reports were really complex stuff to read through. But I just kept reading through more and more of them. Then, I went back and reorganized all the reports I had found by field, and then started reading them over again, starting with the oldest paper first. And literally, by the time that I got through that process, I realized that, taken together, these [Society of Petroleum Engineers technical papers] present basically a fabulous history of the way a young field turns into a middle-aged field, and then matures into a very old field. Basically, what we are doing now in most of these Saudi fields is getting out the last of the easy-to-recover oil. Now, what’s left is a lot of oil—but it is just *very hard* to get out of the ground.

**The issue isn’t that the Saudis are running out of oil as much as it is that they’re running out of their cheap and easy-to-produce oil? So the question is what will it cost to produce their remaining reserves?**

Well, yes. But also—one of the interesting pieces of data that I have gotten since the book has come out—in fact, it was probably the first feedback I got from within the Saudi Aramco camp—was an email I got from a gentleman



who had just recently retired. He sent me an email saying how much he had enjoyed reading the book. Then he added, “Your commentary about the unique oil/water tilt at Ghawar was really interesting and I thought you might want to see the paper that I co-authored last year.”

### I’ll bet you did!

Well, in that paper, if you carefully read it (and I got back to him by email and asked, “Am I interpreting this correctly?”) he talked about North Ghawar, which is this area encompassing Ain dar, Shedgum and North Uthmaniyah, and provided some very interesting information. Now, I had always been trying to figure out what the boundaries of North Uthmaniyah are, because on all the maps that Saudi Aramco has released of the Ghawar Field, they don’t divide it into north and south, nor do they show North Uthmaniyah; it is all just called Uthmaniyah. But what I gleaned from this gentleman’s paper is that this one area, North Ghawar, is basically 25 miles long by 12 miles wide and at the peak, when Ghawar was producing almost 6 million barrels a day, it was producing almost 5 million.

### Geez.

And, through one kilometer well spacing in this area, North Ghawar, they basically have taken all of the easy oil out. So this is an area now that is almost depleted. Now, the bottom 47 miles of Ghawar, which is called Haradh 3, is the big big project they have coming on next year. If it all works, by using 4th generation multilateral well completions with automatic water shutoffs, they think they can produce 300,000 barrels a day for the foreseeable future. But going from an area half that big that you got 5 million barrels a day out of to one twice as big that you might get 300,000 barrels a day out of—that starts to show you what the future of Saudi Arabia’s oil is going to be.

### Assuming they can do that—and that’s in the monster field you call the Saudis’ “King of Kings.”

Right. That is by no means a slam dunk project. It is very technically demanding. They are just starting to take bids on the great Khurais field, which is the second-largest onshore structure, in terms of the geographic area it covers, that they have ever found. It was discovered in 1957, about 70 miles west of the great Ghawar field, through surface gravity mapping. Production began in 1959, but only at minimal levels and they struggled in the 1960s and 1970s to try to get more production out of Khurais, but it has produced only intermittently since then, under primary depletion. Well, they now think that it will be an \$11 billion project. Four years ago, they

thought it would be a \$2 or \$3 billion project. From the bid information, it appears that one of the reasons it will cost so much is that they are going to build two massive pipelines to bring Persian Gulf seawater to the field to inject 7 million barrels of seawater a day—to try to get 1.2 million barrels a day of oil out. And internally they are saying, well, oil production will probably be just 800,000 barrels a day. So you see, when you add all this stuff up, how I can say that we really have a big problem.

### Is that the project that is so complicated and expensive that they’ve been willing to open it up to participation by Western firm again?

No, that was their gas project, which has largely fallen by the wayside. But the service contracts for Khurais are all going basically to the engineering companies in the West. Saudi Aramco is Schlumberger’s largest customer.

### Sure. Who else is going to do that kind of work?

Exactly. But make no mistake. What Saudi Aramco is doing is technically state-of-the-art work. That is actually one of the other interesting things that has happened since my book was published last spring. It has really amazed me. I have now received probably close to a dozen comments from people *inside Aramco* who have read the book, praising it and saying what a fabulous job I did. They had thought that I was basically going to call them all a bunch of idiots.

### You mean that they presumed you would say that they were in way over their heads; didn’t know how to work their oil fields?

Right. But in fact nothing could be further than the truth. And so my book has seemingly started to break the code of silence inside Aramco. “Never talk about what you are doing.” Now, it almost seems like everybody can talk about what they are doing because it is all in the book. So I have a suspicion that the unbelievable commentary that the chairman of Kuwait Petroleum made the week before Thanksgiving—to the effect that their Burgan complex is exhausted and that if they take the production down to 1.7 million barrels a day, they can hope to sustain that for quite a while—I have a suspicion that was the canary beginning to sing in the mine shaft. I wouldn’t be at all surprised if, within the next 12 to 24 months, we start hearing that Ghawar, Abqaiia, and Berri are exhausted, and they can no longer produce at the rates that they have been producing. Because at some point, the denial just won’t cut it anymore. But I mean, look how long Shell and BP kept pounding the table telling their investor relations people, “We are going to grow our production by 5% to 7% per year,” before they finally realized, “Oh, our fields are mature.”

### Getting old isn’t something that humans like to face, in oil fields or on the mirror! But at some point, you do slow down.

That’s right. But admitting that 5%-7% production growth is not going to happen doesn’t mean that they are not going to be producing. It just means they are not going to be continuing to increase production like that.

### Okay, but Saudi Arabia, even if they’re getting a little more honest about production difficulties in certain fields, still has a huge interest in maintaining the illusion that as swing producer, it can control oil prices to a degree. Maybe they can’t hold \$30 anymore. But probably \$50 or so.

I think that they got brainwashed by economists into believing the notion that \$30 oil would destroy their market. And then that \$40 oil would destroy their market. And then that \$50 oil would do it. But now, the higher the price goes, global economies just keep going. Look at the latest issue of *The Economist*. On the back page they have their emerging market indicators. Well, every single emerging market is showing between 5% and 10% GDP growth in the third quarter, when we had \$60 a barrel oil. Or look at the U.S. economy, where third quarter GDP growth was 4.1%—even though we were supposed to have a massive recession because of the higher oil prices.

### **On top of a couple of awful hurricanes.**

Right. But my point is that the Saudis will start getting comfortable with the notion that, “Gosh, these high prices are actually good for us.” Then someone is going to finally raise the issue that this million and a half barrels a day of spare capacity that they keep talking about is a fantasy. The Saudis say it is there but unusable because it is heavy oil and there is no refining capacity to refine it—well, that is all in the Safaniya oilfield. And that would imply that Safaniya could produce a million barrels a day more than it did back at its peak in 1980-’81. Which is preposterous.

### **But isn't that the Saudi's all-time second-most productive field?**

Yes. It was discovered off the coast of the Arabian Peninsula in 1951 and is the world's largest offshore oilfield. Most geologists believe that Safaniya and the Khafji, in the neutral zone between Saudi Arabia and Kuwait, actually share the same aquifer that stretches all the way to Kuwait's giant Burgan field. (When the Iraqis set fire to Burgan in 1991, pressure dropped immediately in the Khafji field and possibly in the Safaniya, too, although the latter drop has never been confirmed in print.) But what you really have to know about Safaniya is that its *production peaked almost 25 years ago*—so the chances that output at that level could be achieved again and sustained for any length of time are remote. This is a field that began production in 1957 with output of 250,000 barrels a day, then steadily grew to more than 500,000 by the late 1960s. But its output peaked at 1.5 million barrels a day in 1980/1981, and more recently it has been estimated producing around 600,000 barrels a day. Now, Safaniya's oil wells produced almost water-free oil until the late 1980s, according to a 1988 SPE report which said, “Until recently, production problems like wet crude, sand production, lack of reservoir energy, etc. had been relatively minor issues.” But in that same year, technical papers were describing the Safaniya as reaching a mature state of depletion. If the Saudi's spare capacity claim is plausible at all, it is only because most refineries can't handle its heavy crude, thereby limiting demand for it in the marketplace to around 600,000 barrels a day. And it's more likely that if it has spare capacity, it's only on the order of a half million barrels a day. But whatever the exact number is, this old, mature workhorse field now holds *the entire remaining spare oil supply of any magnitude anywhere in the world.*

### **Why does anyone believe the higher number?**

Well, they have the cover of being able to say, “there is no refining capacity, but that is not OPEC's fault. So they can continually claim that the markets are well-supplied. “We are doing our jobs. It is just the damn refineries that fell asleep at the wheel.” But now that the world is out of spare drilling rigs, it is going to be very, very hard—in fact, the big fly in the Saudi Arabian plan to make all these new projects work and so to keep their fields depleting at only 2% per annum—

### **—is that they can't get their hands on enough equipment to implement those grand plans?**

Exactly. They can't get the equipment to do it.

### **Even though they have been offering top dollar?**

Oh yes. In the middle of the summer, Saudi Aramco quietly approached Rowan Cos. and said, “If you can guarantee us five jack-up rigs, we won't go out for a competitive bid.” At that point, none of their announced new projects were offshore. Then, right after that, they placed a huge order for pumps for Safaniya. So the idea that Safaniya has 1.5 million barrels a day of spare capacity just doesn't wash. It is in decline. That is the only reason they would be doing that. These aren't very complicated dots to connect.

**Yet you have run into criticism on the basis that your source material, the engineering reports, are negatively biased—because they tend to report how problems are solved. When there are no problems, there's little need to write reports.**

I've seen that. There haven't been a lot of negative book reviews, just a handful. But to state their case to the fullest, one of them said, “It's like someone is reading the newspapers and by the 30th time that they read the word “crime,” they decide, by gosh, there's a pandemic crime wave.” I'll admit, that sounds like a humorous and possibly insightful observation, until you realize that I went through not one newspaper, but more than 300 technical papers. And in the process of doing that, there came a point where I said, “Wait a second, there isn't a Saudi producing area that hasn't been covered in regard to discussions of some oil field problem in these technical papers.”

### **And all of those papers, I gather, weren't about the same technical problem or difficult geologic structure?**

Hardly. But on the topic of criticism of book, it would appear now that the only place I was guilty of a technical miswording in the entire book involved a funny issue—about the difference between getting “close to” dew point and hitting dew point. I have been attacked on those grounds: “God, he doesn't even understand dew point!” But the fact is that this one misstatement is totally irrelevant to anything in the book. I actually did find it pretty amazing that, in the course of providing probably more technical detail than has ever been provided before in a non-technical book about oil fields, this one error is the only one anyone has been able to find. I am actually in the process now of working on some revisions for the paperback version, and it has just been amazing to realize how easy that little fix is and how irrelevant it is to anything in the book. I mean, I really thought, at the end of May, when I was anxiously waiting for the book to come out, that I would probably be attacked—and I figured that somebody would take about 60 different unrelated points—each of which could be interpreted in at least two ways—and piece together a very credible-sounding attack. But as it has turned out, most of the attacks have just been funny. I mean, when Michael C. Lynch [a prominent critic of the peak oil thesis who is a research affiliate at MIT's Center for International Studies and president of Strategic Energy and Economic Research Inc.] finally resorted to attacking the Harvard Business School—saying my book is typical of what Harvard teaches, the arrogance!” I just had to laugh.

### **That does sound like he was reaching a bit.**

Well, I have to admit that the book generating controversy wasn't all bad. If it hadn't created any stir, I probably wouldn't have sold so many copies.

### **Gee, you actually wanted to sell some books?**

Exactly. You don't write books that you hope won't stir up controversy and sell copies. I spent two and a half years actually researching and writing this book, hoping that it would be so controversial that it would open people's eyes to what is going on. I honestly believe that we now very likely have already passed sustained peak oil production, if you redefine peak oil, not as the highest amount that you can produce for a month, but the amount that you can safely produce for at least a half of a decade.

### **That strikes me as a reasonable redefinition, considering that you're talking about a commodity that's the linchpin of the global economy.**

What is so interesting is that once you are approaching peak oil production in any field, your best bet is to lower your rate of production, like they are doing at Burgan in Kuwait, because the lower you take production, the more safely you can bet on continuing to produce from that field for, say, another decade. Conversely, however, the higher you push production at that point, the more you effectively assure a very steep downhill production slide on the other side.

### **That's certainly what the production curves you show in your book would imply. But doesn't it vary a lot, really, depending on the geology of the particular fields and even on the individual production histories of each one?**

Yes. The heavier the oil, the slower the field tends to decline, for instance. But the problem is that what we need is not heavy oil. The stuff whose production

declines fast is light oil. In fact, the lighter the oil, the more it starts to replicate natural gas. And with natural gas, if you wanted to, in most reservoirs you could probably take it all out in year. Because it is a vapor.

**Which implies, again, that most of the good stuff, the highest quality, easiest to produce crude has already been produced?**

Yes. There is an analogy that I have used often since this summer (once I thought it up), because it is so easy to visualize: Imagine a lawn game involving two spheres of equal size hanging from a tree and a bunch of darts. The goal is that whoever, by hitting a sphere with darts, is the first to deplete it, wins \$1,000. The trick is that one of the two spheres is a balloon filled with gas and the other is a canvas bag filled with molasses. You can hit the canvas bag hundreds of times and, if it is a really hot day, the canvas will turn brown. But to get the molasses out, you would basically have to climb up on a ladder and squeeze the canvas bag, after puncturing it with the darts. While with one prick from a dart, the balloon would be depleted.

**Not much of a game, but a good analogy, you're right.**

The tighter the rocks in a reservoir, the more difficult it is to produce the oil. And that is the problem with the bottom 47 miles of Ghawar.

**If that were not the case, we wouldn't have any oil worries, because of all the oil shale out West and all of the tar sands in Alberta.**

That's right. Not to mention that the difference between light sweet crude and tar sands is as profound as the difference between a Bentley or Rolls Royce and a 1947 Plymouth that has been in a wreck.

**You're not stretching things a mite there?**

Oh, it is stupid—or very ill-informed—to assert that they can be readily substituted. Another stupid thing that gets said all of the time is that “oil is just another commodity.” That is as true as saying that “all vehicles are commodities.” Yes, in a sense, but let's hope you realize that there is an enormous difference between a Maserati and a Hummer, much less a Prius.

**They'll all get you from point A to point B, but that's about all they have in common. What you're really getting down to saying is that as long as the Saudis, and the world, are in denial about the limits to their resources, capital is not going to be allocated to what is really needed—finding some new sustainable energy sources for the future?**

Well basically, at this juncture, I don't think that we have time to create new energy sources before there's a crisis. So I think that what we have to do now is to start focusing on how we can get along by using a lot less. Because what we have created is a global system that is marching towards the need to use 120 million barrels a day of oil by 2020 or 2025 or 2027, somewhere in that time frame. Yet we might be very lucky if we have 60 million barrels a day of supply at that point.

**That implies some real tensions building. Who's going to get it and at what price? How do the emerging economies manage to keep emerging without oil to guzzle? And what do I put in my car's tank?**

Yup, it is a model that doesn't work. And if we ignore this problem, it *won't* go away. We will basically end up having fights with neighbors as to who gets it. That would actually become very, very ugly very quickly. It just seems to me that we would be so much better off to get the proper data together so that we can reach some sort of broad consensus on the problem—and about what has to be done.

**Right. Like OPEC is suddenly going to open up its books.**

I don't know. I think all that you would need would be mandated data reform, so that anybody who wants to be called a reliable supplier of oil and gas has to begin producing and publishing field-by-field production statistics on a quarterly basis and also, say, publish the last five years of their production history on a quarterly basis, along with the number of well bores it took to create those quarterly production numbers. With that data, a handful of people could take the top 200 oil fields and the top 200 gas fields, and within months, generate realistic 5-year well productivity rates, so it would be obvious which fields were going up, which were flat and which were in decline. Then you could aggregate them, and start to see whether we are now over the tipping point.

**That's "all"? Commercial considerations aside, you are talking about unprecedented international cooperation.**

Well, if we don't do that, then we are going to have unprecedented international war. I actually think it is in everybody's best interests. I also think this reform has to start with all of the publicly traded companies coming clean. Shareholders *should* start to clamor for that data so they could figure out if there actually is a reason for owning their oil stocks. Allowing the oil companies to continue aggregating their data is like letting General Electric decide that because it knows better than anybody else and because doing business segment reporting hurts their competitive edge, they can fire their auditors and just publish photos in their annual report.

**That pretty much does seem to be the trend—in spirit, anyway.**

Well, we really need to reverse that.

**Production from World's Largest Giant Fields, 1971 and 2000 (thousand barrels per day)**

Field	Country	Date of		
		Discovery	1971	2000
Ghawar	Saudi Arabia	1948	2,058	4,500*
Romashkino	Russia	1940s	1,600	
Kirkuk	Iraq	1927	1,096	900*
Lagunilla	Venezuela	1926	940	
Burgan	Kuwait	1938	900	1,500*
Cantarell	Mexico	1976		1,211
Daqing	China	1959		1,108
Zakum	Abu Dhabi	1963		800*
Rumaila North	Iraq	1958		700*
Abqaiia	Saudi Arabia	1940	893	600*
Shaybah	Saudi Arabia	1975		600*
Prodhoe Bay	U.S.A.	1968		550
Shengli	China	1962		547
Marlim	Brazil	1985		530*
Marun	Iran	1964	893	
Gach Saran	Iran	1928	882	
Agha Jari	Iran	1938	859	
Safaniya	Saudi Arabia	1951	792	500*
Zuluf	Saudi Arabia	1965		500*
Bachaquero	Venezuela	1930	740	
Murban	Abu Dhabi	1960	540	
Rumaila South	Iraq	1953	480	500*
Bu Hasa	Abu Dhabi	1962		450*
Berri	Saudi Arabia	1964		400*
Samotlor	Russia	1961		320
Ekofisk	Norway	1971		310
Bibi Hakimeh	Iran	1961	542	
Sarir	Libya	1961	441	
Minas	Indonesia	1944	408	
Hassi Messaoud	Algeria	1956	387	
Tia Juan	Venezuela	1928	373	
Zelton (Nasser)	Libya	1959	360	
Gialo	Libya	1961	359	
<b>Total Production</b>			<b>15,433</b>	<b>16,256</b>

Source: "The World's Giant Oilfields," Simmons & Company International.  
 Note: A blank cell means the field was not among the top 20 producing field that year.  
 \*Estimated

**Do even the majors know what they have, on a field-by-field basis? It wasn't long ago that we witnessed the spectacle of Royal Dutch massively revising its reported reserves.**

Oh, it was only by a third.

**Nothing much. And that doesn't even begin to touch on the myriad issues involved in oil field accounting—**

True. Then there's another interesting issue: If you sign a contract to buy a 20-year supply, is that the same thing as having proven reserves? The answer is sure, if the field on which you've signed that contract actually has proven supply. But if in fact it has only a three-year proven supply, you shouldn't get to claim 20 years worth of reserves, just because you've contracted to buy oil

for that long.

### And that's commonly being done?

Well, in 2004, if the reports were correct—and I haven't seen any denials—**ExxonMobil** booked 94% of its reported proven reserve additions as a result of contracts they signed in Qatar for gas from the North Field. Now, the North Field has basically two producing platforms, Alpha and Bravo. And, while ConocoPhillips last summer was drilling the wells for the Charlie platform, they hit dry holes. What's more, the quality of the gas is already sufficiently different, between Alpha and Bravo, that it would appear that the geology of the whole North Field is compartmentalized. In any event, the sheer audacity of the idea that you could have only two producing platforms in such a huge area, and know enough to book 30 years of supply is breathtaking. And we are not talking about some tiny wildcatter here. We are talking about the largest, and theoretically the most conservative, of all the oil companies in the world.

### Theoretically. Excuse me, though. Aren't all reserve figures inherently nothing more than estimates, regardless of how much geological testing is behind them? And doesn't oil field accounting then apply all sorts of assumptions to those estimates?

Oh yes. All the per barrel numbers are figured using an estimated 58 years of production. My favorite example of how stupid that is uses a comparison with the building our office is in, in Houston. It is the single most expensive building ever built in Houston. Philip Johnson's great cathedral that is now the Bank of America Center. Well, in cost per barrel terms, that building basically cost 2 cents a square foot. I get to that number by taking the \$300 a square foot that the building cost in 1984, figuring a 50-year estimated life, and giving you the cost per day.

### Lies, damn lies and statistics...

It is just a totally irrelevant number when you calculate "operating costs" in Saudi Arabia without the cost of massive gas and water injection systems or of electricity. It's basically just their labor cost.

### Okay, if your message is "Conserve, now!" the question is how.

Once you step back and ask how we actually cope in a world that will be lucky to have 60 million barrels a day by 2020, it hits you that we have just 5-7 years to make real changes. So these things have to be done simultaneously: First, we have to address the way we distribute goods over long distances; try to eliminate shipping by trucks over highways.

### Good luck!

Think of it this way: To transport a container ship's Chinese cargo from San Diego to Northern New England probably takes 25 days in trucks that get 3-5 miles per gallon of diesel. By rail, it takes just about as long, because the cargo spends most of the time on sidings, waiting to be switched. But if you put the cargo on barges, what they call a six pack pushed by one massive tug, you can move the same amount of cargo that would require 345-350 trucks to New England via the Panama Canal in 12.5 days, with about 35 times the fuel efficiency. What's more, getting the trucks off the highway alleviates traffic congestion which has a bigger impact on the current passenger car fleet than even the most aggressive CAFE standards being proposed, while reducing wear and tear on the highways—not to mention slashing health care costs, by reducing accidents.

### One problem: ports.

Again, that's partly a labor problem. What we need in the next five to seven years are massive construction projects to rebuild railbeds and dredge our river systems and ports, on a global basis. Which should strengthen economies and create demand for blue collar labor. At the same time, we need massive organizational changes to liberate workers from their cubicle

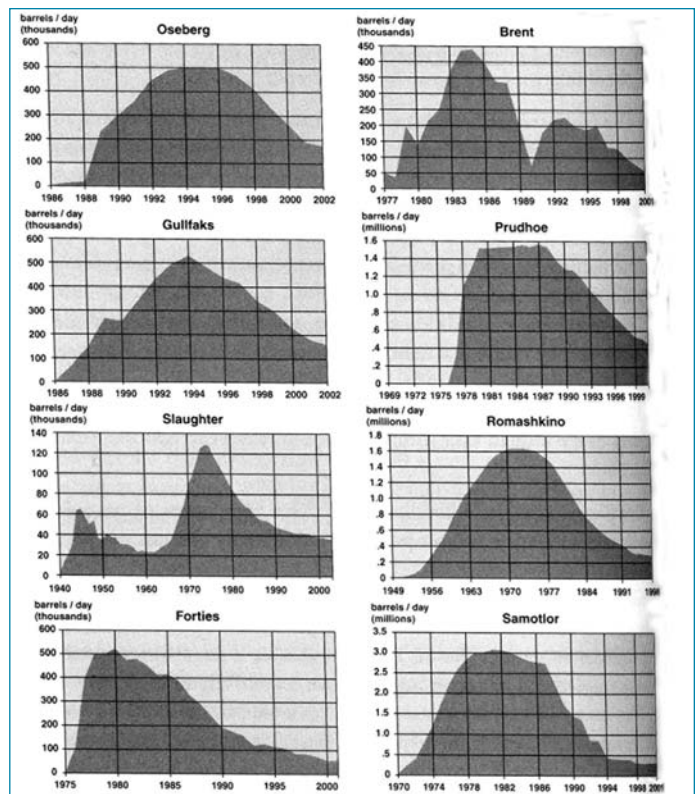


Figure 13.1 Production Profiles for Eight Giant or Super-Giant Oilfields  
SOURCE: Simmons & Company International

farms—to actually start working from wherever they want—and to be paid for productivity, not by the hour. We already have the technology. The third change we need to make to massively reduce society's energy intensity is to totally change the way we currently grow and distribute our food. Globalization of food supplies had provided us with tremendous fresh variety, it's true, in every season of the year. But it doesn't taste very good. We should all end up doing organic farming in our back yards and canning for the winter.

### You're advocating New Age victory gardens?

Absolutely. Finally, we have to end up reversing globalization. Because embedded in what we have been calling globalization is the notion that we can take a manufactured product down to its smallest parts, find the cheapest places in the world to have those parts built, and then zing them all around the world being assembled, eventually, into the finished good.

### Which requires negligible transportation costs.

And assumes that raw materials costs are going to get cheaper and cheaper, so that the only thing of enduring cost is the labor. The problem with all this is that the guy you are paying 50 cents a day is aspiring to earn \$10 an hour.

### And to buy a car.

So what is really interesting is that this energy crunch forces us to try to go back to living in villages—and by doing that we actually end up with a stronger economy and a cleaner economy and we don't have an energy war.

### All that enlightenment sounds pretty utopian to me.

Well, either we get real smart real fast, which I think is pretty unlikely—or we have a really good crisis. And I see a very good chance that we will have a really good crisis this winter.

### Come on. The hurricanes that were supposed to spawn an enormous

**crisis were horrible for the folks they hit, but a non-event, in energy. Gasoline prices are back down a lot. Consumption scarcely wavered.**

That's right. We just set a record last week, we crossed 22 million barrels a day of petroleum consumption in the United States. But that is only because we are still in a period analogous to what they called "The Phony War," between September 2, 1939 and a year later. War was declared but nothing really happened because Hitler was still preparing his massive army to roll West and it took him about a year. Well, if we have cold weather this winter it will become very clear that we have an energy crisis. If we have 10 days of a severe arctic blast in the East, the odds are very high that we will have to curtail natural gas deliveries. That will immediately cause electricity blackouts in the Northeast—which will be remedied by using diesel fuel to generate massive amounts of power—and create a diesel shortage. Then, we will be off to the races.

**Don't the latest inventory numbers indicate that there's plenty of fuel sitting around?**

Not actually, if you look at it in terms of days of supply at current consumption rates. Then, it is at an all-time low. One of the problems we have is that somewhere around one-third of all the statistics out of the EIA, for instance, are just computer simulations and, to get the rest, we *assume* that the reporting companies actually send a guy out on Friday morning with a dipstick— but how likely is that? So to behave as if we believe that there is real precision in those numbers is folly. You don't have any idea at what point you are really down to 5 minutes of supply and everything else in your tank is just the margin of error in all of the statistics. Therein lies the problem in America today. We look at the EIA numbers and get a false sense of comfort. Gosh, we really have a well-supplied market because we haven't run out—yet.

**Even though the hurricanes *did* demonstrate how vulnerable the market is to supply disruptions—**

That's the soft underbelly of the whole economy trying to operate with "just-in-time inventories." When Katrina came, Exxon's Baton Rouge refinery, I think it was, the single biggest refinery in the U.S., capable of refining 525,000 barrels a day, had to apply for emergency access to Strategic Petroleum Reserve oil, because they got down to four hours' supply. People in the energy business thought they worked for Wal-Mart. Inventories are expensive to carry, so no one wanted even an extra hour's worth. What's amazing to me is that everything we are talking about is very obvious. Yet we have economists in the industry and guys like **Daniel Yergin**, the president of **Cambridge Energy Research Associates**, who isn't an economist (he's an historian), who are waxing eloquent about the modern wonders of technology. And about how technology will prevent any energy crisis.

**I've been told that the "don't worry, be happy"**

**report CERA published right about the time your book came out was seriously flawed.**

First, it shouldn't even be called a study. We aren't CERA subscribers, but CNN showed its report to me when they wanted me to debate Dan Yergin, right after my book came out. His company had just the same week published this supposedly great bottoms up, field-by-field report projecting a supply glut. It was very interesting, all 51 pages. It named 30 fields specifically coming on in 2005-2007 that are supposed to contribute about 6.6 million barrels of their 16.4 million barrels a day supply glut. They reference another 12 to 18 fields by name, but give no specific production information. Then, in lots of parts of the world, they talk about "a major area that is in process of being appraised," with no particulars. What's more, there is no reference in the report to the fact that there is an ongoing decline rate in the existing reserve base— even though they do claim that their projections are "net of depletion."

**Of course, if we don't get a polar blast and energy crisis this winter, they are the ones who will look prescient.**

True. But then we will just be postponing the crisis until summer air conditioning season. And every time we squeak by, we just dig a deeper hole for ourselves. But I actually see a tremendous amount of work on peak oil starting to be done now. The media is intensely working this issue now. We just had the first Congressional hearings on peak oil a few weeks ago. Unfortunately, a fellow from CERA came and left a lot of people confused. But Maryland Congressman **Roscoe Bartlett** has created a peak oil caucus. And [Energy Secretary] **Sam Bodman** has asked the National Petroleum Council to do an intense study of peak oil issues, so that will put [ExxonMobil CEO] **Lee Raymond**, Dan Yergin and me on the same committee.

**I'll be watching for the fireworks!**

I am looking forward to it. They might not be. But I think that out of it will come a lot better understanding of how serious this issue is. There are enough people now that have finally started to do their homework. Last spring, the Royal Academy of Scientists in Sweden issued a proclamation that peak oil is a very real event. Until late this fall, the UK had not created a commission on peak oil. But now they have. So, from a standing start 2 or 3, when no one had ever heard of peak oil, there is a lot of stuff going on now. At least people don't look at you like you've come from Mars when you mention Hubbert's Curve. So I am actually encouraged in a funny way. I also find it interesting that the theory that I'd be *persona non-grata* forever in Saudi Arabia after my book was published was not valid. I now actually have quite a few friends there. But I am actually *persona non-grata* among the leaders of some of the oil majors.

**Why am I not shocked? Thanks, Matt.**

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