



Latrobe Financial Management

Scott Bryan Hill

President

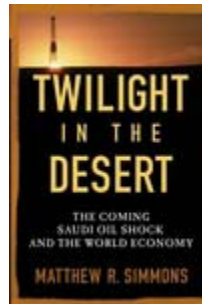
513-891-0778

scott.hill@lpl.com

Matthew Simmons

Chairman, Simmons & Company International and Author of "Twilight in the Desert"

"The GAO Report on Peak Oil"



JIM: In February of this year the General Accounting Office released a report on crude oil. Uncertainty about the future oil supply makes it important to develop a strategy for addressing a peak and a decline in oil production. Joining me on the program this week is Matt Simmons, he's Chairman of Simmons Intl.

Matt, when I saw this report I thought: finally, somebody in Washington is taking this issue seriously. I found that at least encouraging.

MATT SIMMONS: Yeah, I did too. I knew that the report was going to be released in a press conference last Thursday. Congressman Udall, and Congressman Bartlett, I think are two really remarkably great Americans. Bartlett's basically an 18-year veteran Republican from Frederick, Maryland, and a PhD in science. And Tom Udall is a Democratic Congressman from Albuquerque. He's the son of Stewart Udall, probably the last great Secretary of the Interior. So these are two very special people. They happen to also be the co-chairmen of the Peak Oil Caucus. And I felt it was like basically finally the first real official cannon going off saying we really screwed up. [1:35]

JIM: What I find fascinating is the range of estimates that they used in their study. It was as wide as the Grand Canyon. If you take a look at some of the optimistic side which says peak is not reached until 2040, yet we get more evidence – I don't care if it's hearing about Burgan, Cantarell; and especially, we knew that Cantarell had peaked but the decline that they announced earlier this year is much greater than expected; Ghawar. You know, that seems to me to point out that this is closer than we think.

MATT: Well, also, if you look at the GAO table that they have where they have 20 different groups that basically gave them their sort of forecast, most of them don't have a single point in time (which is probably wise) – they have a range. Two or three have a range of 40 years, so you say why even have them in, other than to say they obviously don't have any idea. But it's interesting you can turn that around and say that if you draw a line down with now being the start of 2007, eleven of the twenty have their peak oil arriving within a timeframe that's within now. So the now actually has far heavier weight than 2037 – it's just that basically the outlier was 2037. And so I think they appropriately said that they also said that it takes so long to basically prepare for what we do after that, that even if it turns out that it's 2037, America is remiss at not having a Plan B in place today.

But they also said is that the reason for the uncertainty is that the data is so fuzzy – of course, this has been a hot-button issue of mine for the last five years – that unless we have urgent data reform and start getting field-by-field production reports then we'll actually discover peak oil the old-fashioned way through the rear-view mirror. And the fact they say there are 14 entities within the government, spread out across the face of the government, that are sort of collecting bits and pieces of the sort of data you need to have – so one of the strong recommendations to the Secretary of Energy is pull all of those together in one tight coordinated monitoring and look at this like a hawk because it's going to happen. [3:40]

JIM: They talked about peak oil being dependent on multiple factors: they talked about the amount of oil still in the ground; how much can be recovered; technology costs; environmental challenges; and global demand. However, they are not getting at – in terms of how much we're consuming and how much we're finding – what is the present rate of depletion. I would have expected to see more in that vein.

MATT: Well, the problem is: to do a good job – I mean, I know the team of three people that were working on this came down to Houston and spent really pretty well all afternoon in my office and they had a long, long list of things, and we had a long serious discussion, and I applauded them for having their questions so well thought through – but to do an honest job they've got to plow through Exxon's people, and the USGS' folks, and Cambridge Energy's folks. And I think they were bewildered as they started putting it together by what...I mean people are all over the map on this. But what I find so increasingly interesting is that all the people that have data come to the same conclusion. All the people that basically pooh-poo the idea have a bunch of fabulous theses but they don't have any data. [4:46]

JIM: Wishful thinking.

MATT: Yeah, it's really wishful thinking. And it starts right at the very top of the CEOs of virtually all the major oil companies, but they have no data. They just have a really pleasant feeling that bad things don't happen to good people. [4:59]

JIM: What I also found fascinating – they alluded to the fact and highlighted how much we, as a country, are spending for gasoline each year. I think they pointed out like one year we spent 38 billion more. In California, right now, Matt, super is at \$3.52. However we're still making assumptions that that present consumption trends will continue. For example, in this report they are talking about 118 million barrels a day will be required by 2030, but no real answer as to how we get there.

MATT: Well, the International Energy Agency and their *World Energy Outlook 2006* book had one page that was hand-written by Fatih Birol, the Chief Economist, who shares with me the belief that this is the worst issue of the 21st Century. The fact is that we don't have the most important missing ingredient in the supply outlook which is what the average decline rate is of the existing fields today. And they say that we think it ranges probably from 2 or 3% in some fields or areas, to 11 or 12% in others. In their models showing that you go basically to 118 million by 2030, they assume an average of 8%. If you take that through a calculator, what it assumes is that the current 85 is down to 10. So we only have to find 105 million barrels a day between now and the next 23 years to get there, which has a statistical likelihood of happening of zero. [6:26]

JIM: It's amazing when you consider the size of this country and the amount of energy that we consume.

MATT: How about the size of the world. It's not just this country – this is a global issue.

JIM: They talk about how vulnerable we are now because we are importing 66% of our energy needs – and that figure is only going to get worse.

MATT: Yes, and I've been saying for quite some time that basically the United States was so energy secure in 1970, the year we peaked in our oil supply, and the country that was held out to dry turned out to be Japan. Well, we're Japan of 1970, in circa 2007. In that short period of time the United States has become far more energy vulnerable than Japan was – because we consume so much. [7:09]

JIM: One of the difficulties I think that we have when we discuss the peak oil issue is they talk about the amount of oil that is left in the ground, and it ranges from one trillion to three trillion. Isn't the real problem that we have here is equating reserves with production? For example, they use figures like there's 170 billion in reserves in the Canadian oil sands, but the Canadian oil sands are never going to produce at the rate that Saudi Arabia does.

MATT: If the Canadian oil sands ever got to 3 million barrels a day, you would have basically destroyed Alberta. It is so unbelievably energy intensive and water intensive to do that. That's why we should just toss – reserve data is now so worthless that it's meaningless. You mentioned Cantarell. I spent a week ago yesterday, pretty well all day at his request,

visiting with the new Director General of Pemex, and Mexico thought they had 50 million barrels of oil 7 years ago – they now think they have 13. And what they now know because it's happening in front of their eyes is that the world's second largest producing oil field, Cantarell – that has accounted for 6 out of every 10 barrels of oil that Mexico's produced for the last 40 years – finally went into a tertiary recovery program. They went from 40 producing wells to 440 producing wells. The 40 producing wells from 81 to 96 produced a million barrels a day without a hiccup. They now have 440 producing wells and they nitrogen injected the gas cap which was like stepping on a tube of toothpaste, and it ramped the production all the way up to 2.2 million barrels a day. And all of a sudden it's in decline, and it's declined by 20% the first year. They are hoping that the decline rate slows down to 14% - but it's just a hope. And my commentary was if you look at the production profiles of all sorts of publicly available data on giant producing fields that have now done sort of the most aggressive sweep of their oil, it doesn't slow down until you're down to about the last 10%. Then it slows way down when you manage the tail. [9:08]

JIM: Yet the remarkable thing, as you're describing what's happening with the second largest oil field, there are similar problems with the world's largest oil field.

MATT: There are similar problems with the world's third largest; there are similar problems with the world's fourth largest. You can go down the top twenty producing oil fields and there might be one or two that are still in their ascendancy – but the rest are all in irreversible decline. That's what makes it so hard for me to fathom why some people can so casually say that peak oil is an event that won't happen for decades, and then we'll have an undulating plateau for decades. And I say, "give me a break, where are they coming from?" They have access to the same data I do. [9:44]

JIM: Is it just something that is optimistic because I mean if you take a look at – and this gets back to the reserves data – and you look at, okay, we have the tar sands, and maybe we have shale oil, we have deepwater oil, and the assumptions out there that we have all this stuff, maybe not in the conventional form, and we'll just substitute that stuff.

MATT: Yeah, that's exactly what they are doing. And Dan Yergin at CERA, along with Exxon, have probably become the two loudest voices that we have no problems. He basically loves to go back and remind people over the last one hundred years we've had several times when we were basically worried that it seemed like we had run out of things to find – he always said "run out of oil" but it's never been that, it's run out of things to find – and then, bingo, we find a new oil basin. Well, he's actually correct, as we started from no idea what was there to now we've basically swept the world. What he is basically assuming is if you do that for one hundred years you can do it for another hundred years. And it's a terrific economist sort of thesis – but you can also go back and say that Cantarell in 1975, 76 was the last oil field that we've ever found that basically produced over a million barrels a day; and the North Sea fields were the last fields that we ever found that produced over 500,000 barrels a day. And now we basically have Thunder Horse may be coming on in 2009, as opposed to 2005, that may be it will produce 250,000 barrels a day – that's the biggest deepwater field we'll ever do. And so the average new field today – you know, giant field – produces about 40- or 50,000 barrels a day for a couple of years and then goes into rapid decline. That's just real numbers. [11:25]

JIM: I guess I see one of the real challenges here, as we're talking about these statistics, is developing alternatives as soon as we can but the alternatives are going to depend on the price of oil remaining high. But yet, Matt, I watched a program this morning where you had a bunch of economists and they were talking about, "well, the US economy is going to slow down, as that happens we're going to have demand destruction and the price of oil is going back below 50."

MATT: Yeah, they're crazy. As a group they are so flippant, they've been so discredited on the price of oil is going to go back. It was going to go back at 25, go back at 30, going to go back at 40; \$30 oil creates a recession – everybody weighed in on that. We blew through \$30 like a warm knife through butter. Interestingly today, this morning when the Iranians said we're going to let the sailors go, oil prices collapsed by a dollar. Well, at the end of the day, I just checked spot prices around the world, and Tapis grade (which is South East Asia's light sweet grade) is basically \$73.75 today – cash market. Cusiana is \$71 – that's Colombian light sweet crude; Mayan crude in Mexico is \$51. So there's a \$20 spread today between heavy oil and light oil. So we're back to \$70 a barrel, it's just basically not there in WTI even though the forward price it got, the price crossed 70 for December crude. All we need is just a little bit of a hiccup – a little bit of spurt in demand and supply not growing – and we're likely to have the same thing that happened yesterday in Colorado where a lot of service stations ran out of gas. And that's a temporary problem because one of their refineries in the Rocky Mountains had some maintenance problems and so they are out of gas. But the world is right on the verge of being out of – run out of oil. But we're in basically have demand outstrip supply. [13:11]

JIM: You know, I think one of the problems that we have here, Matt, and especially in this country we were so fortunate to have large oil reserves. We were self-sufficient and when our oil ran out we just simply went overseas and bought it from somebody else. So all these economic models that they talk about – the financial guys, the economists, and the Wall Street people – well, typically that held true: if you went into a recession in the past, demand would go down, the price of oil would come down. But we're not there anymore.

MATT: Yeah, it's just all the old formulae got thrown out the window. And to basically say, "well, this will be just like the 70s, we'll have a spike, and then go down." I say, that's like somebody saying at the outbreak of World War II, "well, this is just going to be like the Civil War." It turned out basically it was about the same length, and it was just as awful in its region, but it had nothing to do with the Civil War. [14:01]

JIM: As I went through the GAO report, another problem is that – as they address – a lot of these government agencies they spoke with in putting this report together, their efforts were not specifically designed to address peak oil. In fact, the Department Of Energy said there is no formal strategy for coordinating and prioritizing Federal efforts dealing with peak. And right now, the hot topic in Washington is global warming. It's like putting the cart before the horse.

MATT: It's amazing how this one report from the United Nation's study group, and Al Gore's movie, finally just put the icing on the cake that, "oh my gosh, let's all acknowledge global warming's here." And I say that climate change is probably a very important issue. I do not pooh-poo that at all. I think we need far better data to understand the implications of whether it's CO2, or methane for instance. There's a lot of data in that same report that methane is three times more lethal – it's just that we don't know how to capture it, and so it's easier to pick on CO2. But peak oil is far more real. The data is far more compelling, and the impact on our lives in the next three years is utterly awful if we ignore it and it happens. [15:14]

JIM: It surprises me, and maybe it's because of these old paradigms we're asking the wrong questions. I mean, I am still to this day floored every week when they report these inventory numbers on Wednesday and Thursday. I think something more meaningful might be: what is happening to the depletion rates of the oil fields – as you mentioned; what is happening to car sales in China – some of those things; and how much did we find last year compared to what we consumed? That seems to me more relevant.

MATT: I couldn't agree with you more. And then the pundits that follow the inventory reports like they're racing forms don't have any idea how to properly read the data. You can have ten million barrels more inventory than you did five years ago, but if your demand is way up on a day's supply you're in the hole. So we're operating right now as close to a just-in-time supply as you could possibly get. I'll tell you what's most alarming – I'll go back to Mexico for a minute – is that if it turns out that the 20% decline rate is correct, that it doesn't moderate (and there's no earthly reason that it would moderate in my opinion other than just phenomenal good luck), then sometime between now and 2010, Mexico fails to be able to export any oil. And from a US Gulf coast refinery standpoint that is basically a Pearl Harbor day event. And then it puts us unbelievably at the mercy of Hugo Chavez in Venezuela – other than the fact that his oil is basically probably in as big a disarray, other than the synthetic crude projects that he just nationalized. So we have some problems right now that are on our doorstep that are not decades away – they are basically between now and 2010. [16:49]

JIM: One of the things I think should get more coverage in the press – one thing that strikes me – is despite spending tens of billions of dollars in Saudi Arabia they've been unable to really increase their production.

MATT: Moreover, there are now a growing number of oil sleuths who are plumbing through...I don't know if you've ever gone on The Oil Drum, which is the most sophisticated energy blog on the internet?

JIM: Sure do.

MATT: They've had some fabulous exchanges of guys who basically have gone back and lined up all the right data you can get on these new fields that came on in Saudi Arabia, and the fact that they didn't basically increase production. They did come on. So what we don't know is where is Ghawar today – is it basically under four, is it under three? We don't have any idea. Is Saudi Arabia producing nine or eight? We don't have any idea. What they say is they have 11 million barrels a day of productive capacity, but if we have oil prices up in the 80 or 90 or \$100 a barrel this summer because we have too high a demand, they are going to look awfully silly if they basically say, "well, we have 11 million barrels a day but no one wants our oil." [17:54]

JIM: I was going through the report they were talking about our deepwater oil, and they estimate that will peak in 2016. But if you really boil it down – and this relates back to Saudi Arabia – they conclude that US demand for oil will need to be fulfilled by increases in production from the rest of the world. But here, Matt, you and I are talking about the largest producer in the world, and they can't increase their production.

MATT: The reality – it would be nice to think otherwise – but the reality of the Middle East oil is that there were 35 giant fields that were discovered, and they were all discovered in a very narrow area. If you sit in the EXPEC center of Saudi Aramco in Dhahran and watch this really well put together 3D movie, the movie starts out with a depiction of the earth cracking and the creation of the Rift Valley and the Red Sea; and what they show is that basically effectively scraped the

whole Arabian Peninsula of several thousand feet of what was once rich swampland over until it hit the Zagreb [phon.] mountains – and that's why these 35 fields are lined up perfectly North to South like they are tankers on a radar screen coming out of the Straits of Hormuz. That's all the oil that basically got created in the Middle East because of that one event.

What I found out to my unbelievable amazement as I went back and read some SPE papers about Cantarell before going to Mexico last week, was that in the mid-90s they discovered the most amazing fact that they basically through magnetic surveys the largest meteorite crater that's ever been discovered was this meteorite they believed hit earth 45 to 60 million years ago and created a ten-by-ten mile crater – that's the Bay of Campeche. Within that crater floor is every giant oil field of Mexico.

So two acts of God created two of the most prolific basins the world has ever known. And yet for a half a century we sort of assumed oil was kind of dispersed around the world equally, and if we just had two million rigs at work we'd basically be producing 200 million barrels a day. No one ever quite said that, but that was sort of the implication of the architecture that we created for the world we now have. [19:57]

JIM: Another issue I find absolutely fascinating in this whole debate, and I've interviewed authors who think peak oil is a myth, some think it is far out in the distance, but when I take a look at it and you boil it down, you've got about 75% of the world's oil lies within OPEC, and another 10% in Russia – their reserves are unaudited, so how do we know what they have are real? They increased by 300 billion in the 80s with no major discovery. Then many OPEC countries, their reserves remained constant.

MATT: Well, they produced another 350 billion barrels of oil.

JIM: Yeah. And you know, the government report even acknowledged this. They said, "wait a minute, Kuwait has not changed its reserves in the last two decades, and yet we know that they produced 8 billion barrels of oil." The fact that nobody questions this is just remarkable.

MATT: I find it so utterly naïve for people to just say, "you're stupid, just look at the 265 billion barrels that Saudi Arabia has." And I say, yes, I know because of the research I did that the senior executives at Aramco under oath told the same GAO entity that there were basically 110 billion barrels in 1979 (of proven reserves under SEC standards) and basically since then they've produced down to where that same number would be probably today 18 to 20 billion left. And yet they say they have 265 billion, and they have another 200 billion sitting in reserves if we ever need it. And people say, "thank you, I didn't realize that." I can tell you on your program that, trust me, my net worth will exceed Bill Gates' by 2030, and you'd be a fool to believe it unless Bill Gates had a terrible financial collapse. There's nothing illegal about me *telling* you that. I can want that – and that's kind of what the world has done. [21:52]

JIM: But see – they talk about the US government's assessment of world oil regions and they talk about there's the potential there for 2.3 trillion; and they're talking about 890 billion current; and then a 1.4 trillion potential to be added. Where does it come from? I mean, is there a place we haven't looked at?

MATT: Yeah, there are – the Arctic and the Antarctic.

JIM: But how do we get it?

MATT: Well, we don't. But if you want to basically be optimistic, it's like me saying I'm going to be as wealthy as Bill Gates. There is nothing illegal about me wanting that. And that's the same reliability of these numbers of the USGS. The USGS is a fine group of computer modelers, and there are some trained geologists there. But unless you drill for oil and find something there have been estimates all the time and through the history of the industry of an area that has so much oil, and the sad history of the industry is that most of the new field wildcats we have drilled have always been dry holes. No one has ever intentionally drilled a dry hole. It was just basically an optimistic assessment that went wrong. [22:53]

JIM: You know the other issue too I think that even if you talk about unconventional oil, deepwater oil, the tar sands and shale, is nobody is estimating, for example, the amount of energy input compared to the energy output, which is the real issue I think I have with ethanol. Right now, it's a real net energy loser.

MATT: We just didn't ever develop any data to be able to do that. And for years it wasn't very relevant. Here's an interesting number that I got out of a really well done report of *The Future Of Geothermal Energy* by MIT. There are nine producing states in the United States that produce 4.8 million barrels of oil, but those same wells produce 128 million

barrels of brine. So basically the United States has gone from the world's biggest oil producer to the world's biggest producer of brine stained with oil. We're just pretty good at getting the stains out. And these are real facts. [23:47]

JIM: Let's talk about something that surfaced last year that everybody was very optimistic – let's talk about that Jack well by Chevron. I don't think people realize that when you get to deep water, oil, number one, how expensive it is – you've got drill ships in the Gulf today that are costing companies half a million dollars a day; and then you have that Jack well as I recall, wasn't it close to 100 million to drill that well?

MATT: I think it was probably closer to 150 million because they hydraulically frac the well which is the only way on earth that it would have any way to flow because those reservoir rocks of the Lower Wilcox are very, very tight rocks – they just don't produce unless you frac them. The folly of the Jack well hype is they could only afford to flow test it for 30 days. Well, you talk to any oil operator that's drilled in tight, deep formations where you have to do a very expensive hydraulic fracture – and they only stay open for so long until the pressure cracks the proppings and they are tight again. So what we don't have any idea is because they couldn't have afforded to let that well flow with an expensive meter going on of a very, very expensive rig – so they basically hardly know anything about the Jack reservoir. And Chevron basically says it probably maybe 300 million barrels, or 500 million barrels. But how that got translated within a day to, "oh, we found a new Prudhoe Bay," is saying, "well there are 180 miles of lower Tertiary trend and if you found 60 Jack fields, you'd be at Prudhoe Bay." I say we don't have any idea yet realistically whether the Jack field will ever be produced. [25:24]

JIM: Given the things that we are talking about here, not only the difficulty that Saudi Arabia and other countries are having keeping up – having to run faster to keep up with demand – Matt, we haven't even discussed the political risk factors because if you take a look at the majority of the world's oil it's inaccessible and held in very unstable, political areas of the world. For example, Hugo Chavez may not have the same incentive as Exxon to develop Venezuela's oil reserves. So you have 85% of the world's oil reserves in countries with medium to high investment risk; and three countries – Saudi Arabia, Kuwait, and Mexico – that prohibit foreign investment.

MATT: There's also an issue that as the visibility of the Cantarells of the world, and how fast they can decline becomes reality because there's such good transparency within Pemex because it's so utterly important for the Mexican economy, that you're starting to see for the first time loud, important musings by some of the oil producers – and this is Russia, in particular – who are saying: "We don't think it would be prudent to actually continue producing oil even at our current rate. Until we have discovered a new generation of oil fields – which we haven't had happen since the late 60s – why don't we basically lower the rate of these fields' production so we don't risk becoming Cantarell too." And that is a very legitimate issue. If I were Mexico today – as painful as this would be temporarily – I would lower Cantarell's production rate to about 800,000 barrels a day, and keep the other sister fields next to it from going into a nitrogen injection – or do the nitrogen injection but then don't let those oils flow as fast as they can. Cap it – and let it last at a lower rate for 10 years while they try to figure out what in the world do we do once we are basically no longer a major producer because otherwise they have no Plan B, just like we have no Plan B. [27:16]

JIM: And speaking of Plan B, as we look at alternatives, one fact as the GAO report talked about, their development – and let's assume we start this right away – are dependent on not only high oil prices but they are only going to be part of this solution. The best case scenario under the GAO is they would only make up 34% of our needs by 2025 – and I don't think we have till 2025.

MATT: Yeah, I don't think we have till 2010. It's a pretty grim picture. Now, I can turn around and turn into a very optimistic person saying that the minute we acknowledge peak oil is an enormous risk, it might have already happened, we need to have oil prices go way up from where they are today. We're still giving this stuff away. And \$65 a barrel, I keep reminding people – I know I've said this on your show before – is 10 cents a cup. Anybody that thinks 10 cents a cup [is reasonable] for an irreplaceable, extremely capital intensive resource is stupid. So if we basically end up having very high oil prices and we unleash the biggest wave of technology we've ever done, to try to invest in some sustainable biofuels (which is not corn-based ethanol), and some forms of energy that actually scale (which is not wind and solar – they are going to be fabulous but they are going to be very limited in their scope) it's possible over the next five to seven years that we actually open the door to some forms of energy. I've spent a lot of time over the last year and a half working on trying to better understand the broad concept of ocean energy which is about nine forms of energy that come in our oceans and we sort of tap those. That's the one thing we know that we'll never run out of which is sea-water. And I think it's amazing how little we've ever done in some of these areas that aren't even vaguely as capital intensive as fuel cells or corn-based ethanol, but we haven't worked on them. If we basically use very high oil prices to take our rusty infrastructure and totally rebuild it the next 10 years we'll have the best economy we've ever seen. But if we sit on our duffs and keep saying, "oh, don't worry about it, we have plenty of oil," then we'll basically have the worst collision you can ever imagine. [29:23]

JIM: That was something that they reached in their conclusions. They said what happens as peak oil arrives will depend on our preparedness, and also if it comes without warning, and it comes sooner, we're in deep trouble.

MATT: Yeah. That's why I thought the GAO report was such an important first step – I mean it was a baby step in a lot of senses, but at least it's the first step, and it's going to be hard to basically just ignore that. And I'm sure that Sam Bodman who's our Secretary of Energy, who's a very smart guy, well, he actually had read it and endorsed it. Congressman Bartlett and Congressman Udall are now just getting started in trying to really just wake the Congress up to saying this is really a serious issue. The UK, the European Union are finally saying it looks like this is an unbelievably serious issue. It's too bad we didn't start ten years ago. [30:11]

JIM: I heard you say this before, and you said it last time you were on the program that your prediction in the next year and a half, right now, Washington is abuzz with global warming – that's the hot political topic du jour but as we move past \$80 a barrel and maybe towards \$100, peak oil becomes the number one issue. Do you still hold to that prediction?

MATT: Yeah, I sure do. It sounded a lot more outlandish when I said that a year and a half ago – I think it was maybe first on your program.

JIM: I can remember that. I think it was 2005 when we talked about *Twilight*.

I want to talk about something that to me is ignored, and to me is part of the solution and can offer a wonderful opportunity for Americans in terms of jobs – let's talk about the energy infrastructure because whether you're looking at drilling rigs, our pipeline system, gas plants, the condition and age of our refineries, our coal and nuclear plants, let's talk about where we stand there, and what the opportunities are.

MATT: Well, first of all, the one thing that we know about this is everything that you can visibly see, it might have a nice paint job, and oftentimes it does, but if you scrape behind the paint it's very rusty old iron. And iron doesn't last forever; and iron in contact with oil corrodes because oil is a very corrosive agent. When you get brine combined with oil it's basically one of the most corrosive things and we barely have anything that's new because for thirty years we couldn't afford anything that's new – other than a few new pipelines going to areas that we didn't have any before. But 95% of the world's energy infrastructure my guess is – from refineries to rigs to tankers to pipelines – basically beyond it's original design life. If we don't start to replace that then with a very high likelihood because we are basically racing against the clock, ten years from now we can easily have the indignity of finding that our oil and gas production is down to 80% of what it is today – but our delivery has basically pushed it down another 30 to 40%. That would be an inconvenient truth. [32:22]

JIM: I've asked you this before but given the fact that we now have this report coming out of the General Accounting Office – so it's getting visibility – if you were made energy czar: number one, what would you do right now, what would you start today; and number two, given what you know is going on in Washington, is there anything along the lines that you're thinking that they are working on?

MATT: What I would do today – I would only take the job of energy czar if I basically had that with total authority for a week around the world because it's not a US deal anymore. And the first thing I would do is order all of the owners of the top 250 producing oil fields to cough up within a week their historical field-by-field production over the last 60 quarters (5 years) to some global supply office, and start reporting that every 45 days. And anybody that basically wants to stay in the dark and hide under the veil of "we don't want transparency," if they want to export their oil outside their host country, or particularly inside the member countries of the IEA, I would slap a \$10 a barrel transparency fine on the oil and use that fine to basically create an army of people to basically go figure out what the real answer is anyway. Because without that data we can basically argue and argue and argue on what is the average decline rate, and how much longer, and how much unconsumed oil. And the next thing I would do – that would be day one.

Day two would be to organize a group of people to start in to creating the finest oil basin the world will ever actually create and that field is called conservation. And this is basically a plan to attack the way we transport people and goods because 70% of the oil barrel does that; and liberate the workforce and let people work when they want, and where they want and pay by productivity; and stop shipping goods long distances by truck and put it all on water; and ultimately, figure out a way to end what we casually call globalization which is taking parts and finding sweatshop economies where there are people willing to work at 50 cents a day and having parts made and then zigging them all the way around the world, and zinging food all the way around the world. That's how we actually consume 85 million barrels a day of oil. And if we put together a sort of plan that has some teeth in it within five-to-seven years we could theoretically lower the energy intensity by maybe a third – maybe even slightly higher. We'll never do that by a new suite of even more fuel efficient automobiles – it takes 30 years; we'll never get there by turning all our light bulbs off because that doesn't have anything to do with oil use in the first place. And then I'd basically retire and go back to basically speaking out on energy issues and how healthy the economy is going to be seven years from now if we get the job done. [35:05]

JIM: Well, let's take the first issue you would have done which is 85% of the world's oil is non-transparent and it seems like there's an incentive for that 85% to keep it that way.

MATT: Well, there isn't an incentive because nobody gets hurt by producing the data. They might get embarrassed – they don't get hurt. In the North Sea it's been a mandatory requirement that we have field-by-field production reports monthly – it still didn't prevent all the operators from missing the fact that they were peaking because they didn't look at their own data. But at least we had the data. I could figure it out ten years ago, and publicly spoke out and wrote written reports that I can go back and point to that said the North Sea is likely to peak between 98 and 2000. And I threaded the needle pretty well because it peaked in 99 because we had field-by-field production data. And anyone that wants to hide behind the transparency can basically pay a transparency fine – even make it \$20 a barrel. If you get the fine high enough they'll cough the data up. [35:57]

JIM: Why do you think they're reluctant to do so. I mean what do they have to gain by doing it – just avoiding embarrassment?

MATT: I don't have any idea, other than embarrassment. The public companies don't want to do it because they say, "God, if people knew how old our oil fields were they'd basically sell our shares." And I basically say to the contrary – if they know basically that we're going into production decline that means prices are going way higher. Your stock price will probably go up, guys. [36:19]

JIM: And is it maybe revealing for like Saudi Arabia to say, "well, gosh guys, we don't have 260, it turns out we maybe only have 25 and 30 left."

MATT: It would be embarrassing, but it doesn't mean Saudi Arabia loses their stature in the world. It basically means that we're basically being more poignant about how fragile the supply is. Right now by posturing that they have 265 billion barrels they make people madder than hell. Why don't you lower the damn price then. So I think they have caught themselves in their own rhetoric in kind of a nasty corner. But it's not my problem.

JIM: How do you see this realistically unfolding. I mean we are having some people in Washington that are more cognizant of the issue; we have some very heroic figures like Udall and Bartlett who are moving to educate Congress in this area. But it seems to me like we've gone beyond avoiding a crisis; it seems like a real crisis is what's going to help get us to the area where we start thinking about conservation and start thinking about the way we run our economy.

MATT: Yes, and you know a real crisis is likely to be just around the corner because take 2007 for instance, I think it is really, highly unlikely that we will have any significant supply increase in 2007. And I can't imagine that demand isn't going to basically jump another million or two million barrels a day; and we've taken our usable inventories down to such a low level that there's a high risk that basically demand outstrips supply and usable inventory – and that spells shortages. And you know, when I saw the news yesterday and a significant amount of service stations in Colorado were now out of gas because one refinery went down, it just reminds you we are living on the edge of basically a precipice. And so a crisis could happen any day – we just don't know the day.

If you go back to two of the great crises the United States has been involved in – I'd actually argue probably the two greatest – they were the Civil War and World War II. You could have said with great certainty, within two or three years of both events, that if you were looking at the big picture correctly that war is inevitable – we just don't know when it's going to start. [38:24]

JIM: If you were addressing a group of our listeners in a room today regarding this issue, where would you tell them to look, what would you tell them to do, what would you tell them to read?

MATT: Well, I would basically say that just clamor for energy data reform so we get this field-by-field production data. You know, tell your Congressmen that it's the most important thing; tell your mayors it's the most important thing. I would basically try to get each community to prepare a contingency plan for what are you going to do when oil peaks. What I wouldn't do is sit and home and mope. I would basically become a very loud advocate. I would probably avoid reading all of the optimistic reports zigging around because they just make you feel good – they don't have any good data. I'd go on some of these unbelievably informative blogs like *The Oil Drum*. And let me focus on YouTube. I didn't even know what YouTube was other than remembering that Google paid a fortune for whatever this thing is. I was on CNBC last Thursday afternoon to talk about the GAO report, and I was surprised when someone informed me to go on YouTube the next morning and they had the 10 minute interview live on YouTube, and there were 676 people that had seen it. Last night I checked and there were almost 10,000 people that had seen it. People are listening. [39:38]

JIM: Absolutely amazing. Well, Matt, as we close why don't you bring us up to date on *Twilight*. I know last time I talked to you it was being printed in Chinese; it's out in paperback form; and in German.

MATT: Yup. It's been really remarkable. I guess it was 9 weeks ago now that I spent four days in Beijing for the book launching and I couldn't believe the elegant job that the East China Normal University Press had done. And the praise it got within some really senior people in China, as being maybe the most beautifully translated book from English into Chinese, was really unbelievably neat. I was told last week that it has now sold 3700 copies in the first 6 weeks, and that almost every senior energy planner has read the book. The praise I got for basically doing this, and then helping the Chinese translators make sure that they properly was just unbelievable for a country that has a lot to lose by missing this. And I found to my surprise that some of their senior energy people were far more alert to peak oil. There was a program on the Saturday I was there at the Chinese Academy of Social Science, and after I spoke, Professor – somebody – I should remember his name, it was in Chinese, gave a talk in Mandarin that was simultaneously translated. And towards the end of his talk he said, "two hundred years ago, Mozart created this unbelievably beautiful music that we still love listening to today." I thought, "where is he going with this?" And he said, "the reason for that is that it was so perfectly harmonious. There is nothing harmonic about peak oil. Its high notes are too shrill." [41:11]

JIM: Wow.

MATT: That's a really profound statement. I think the English copies – I'll get a report at the end of April – but I think we'll probably cross 100,000 books which I didn't realize how few books ever do that. So the book in German through an intermediary was delivered to Pope Benedict the 16th. I have a lovely framed letter now from the Secretary of State's Assistant to the Vatican thanking me for the efforts of alerting the world to peak oil. That's pretty neat stuff.

MATT: That's something to be really proud of. Well, Matt, I appreciate you joining us on the program, and I appreciate the efforts you put in to alerting the world to this very issue because as we started this conversation I think it will be one of the defining issues of the 21st Century.

MATT: Well, I thank you for the time you've taken on your program – your articulation of the issues is fabulous.

JIM: Well, once again I want to thank you for joining us on the program and please come back and talk to us again in the future.

Matthew R. Simmons
Chairman, Simmons & Company, Int'l & Author, Twilight in the Desert
"Critique of the CERA Report"

JIM: Last week the oil markets received a bombshell: peak oil theory falls down according to the CERA folks; and we will not reach peak oil until the year 2030; and the world's reserves are estimated somewhere in the neighborhood of 4.8 trillion and growing.

To challenge those assumptions joining me on the program is Matt Simmons.

Matt, I want to get to this figure here, where they talk about one of the first assumptions of the CERA report is that we do not get to peak oil until 2030. Let's talk about that one first.

MATTHEW R. SIMMONS: It's interesting. First of all, I'm so glad you didn't call me yesterday, because I've been out of the country and I saw when I was pulling up my Blackberry about 20 different people sending me saying, "did you see this press release?" And until last night, I hadn't had a chance to read the – I've got it right now in front of me – 12 or 13 page report.

Now I have read it, and I'm a lot more comfortable talking about it.

The first thing I found a little bit strange is that they basically say the global resource base is 4.82 trillion barrels and likely to grow. And I thought, why would you ever say '4.82' ? Why wouldn't you say '4.5 to 5' ?

But by doing the 4.82, they create the illusion that there's a precision there that they have that is far beyond anybody's ability to grasp. They talk about 'yet to discover' oil that they have a specific number for. And I just think people shouldn't basically do these sort of reports, and claim to be so precise, without a huge caveat saying, "by the way, this is just our own hunch." [6:55]

JIM: And shouldn't it be more realistic to give like a range instead of 4.5 to 4.8?

MATT: At least '4.8' is better than '4.82.'

JIM: They're talking about cumulative production of over a trillion. Then they get the Middle East reserves. And we all know from 1985 to almost 1990 Middle East reserves grew by over 300 billion that nobody can account for.

MATT: Then even worse, that number stayed static for 17 years – that didn't grow – and people started thinking it was a conservative number. [7:29]

JIM: The other thing here is they've got enhanced oil recovery – now, granted, with technology oil companies have been able to get more oil out of the ground from existing wells. But the thing that struck me was that despite the fact that they've been able to replace their reserves from existing wells, production has not gone up in the United States; it hasn't gone up in the North Sea; it hasn't gone up in the North Slopes of Alaska. Production keeps falling.

MATT: Yes. What I think the reserve appreciation thing is all about now, is once you've declined to a pretty low level, and as long as the price is high enough, there are a lot of techniques – some of which we had 30 years ago – that you can do to keep 10% going for a far longer period of time. But you've already gone from 100 all the way down to 10% before you start doing those. So I call it 'managing the tail.' [8:21]

JIM: The other thing that struck me here, for example, extra-heavy oil: 440 billion; oil shale: 704 [billion]. You get to the tar sands and you get to oil shale – that's a mining operation; that's much different from pulling oil out of Ghawar.

MATT: There's a huge difference between oil sands, which is a mining operation; tar sands which is a mining having injections with steam.

And oil shale might, or might not, some day be commercial. But as of today, it's commercial in the most limited sense of the word. So to actually kind of lump that altogether is casually, flippantly dangerous – or naive.[9:01]

JIM: What about the exploration potential where they have 758 billion? I mean where does that number come from?

MATT: Once in a while I like to speculate my net worth by 2030. Luckily, I've never had the audacity to go into a bank and say, "how would like to make me a loan against my estimated net worth in 2030?"

For a subject so serious, I actually shouldn't be flippant about it. But when I read the report last night, I really thought, you know, I just don't understand where these guys are coming from. And it's basically laden with "we're the experts." [9:41]

JIM: When it came out last week, it was all over the financial channels.

MATT: I gather.

JIM: Oil got hammered. And here we are, we know that, for example, they issued a similar report in the year 2000 when we had a ton of natural gas and we know that natural gas production has peaked in Canada, here in the United States, and a lot of it – the so-called stranded – has yet to be proved it actually exists.

MATT: Yes. Back in 1998, 1999 and 2000, the National Petroleum Council was feverishly working on a massive report for our government on taking a very careful look at the reliability of our natural gas base, as we've accidentally turned the whole energy future of the United States, and the whole growth of our power sector, into the hands of the natural gas industry. And of the 150 people working on this, I was known as by far as the most negative because I had some grave concerns – and a growing number of operators in the industry had grave concerns – that the decline rates in natural gas were so high now that it was really unlikely to see the supply grow by even 10%, let alone grow by 35% in a decade.

And as the controversy grew of the reliability of that report, CERA defended stoutly that we had unbelievable amount of growth. I was on several programs with CERA people who said, "Matt is wrong, he is dead wrong, and I'll prove it to you." What they did is show a PowerPoint, and they showed the supply story. Well, had they been right, supply would have basically been about 30% higher today than it actually is. And it turned out our supply of natural gas in the United States hit a secondary peak, far below the first peak in 1973, in 2002. And it's down about 10% since then. And had it not been for the Barnett Shale, and some associated gas coming from deep-water, it would probably be now off 18%.

And about 3 years after, CERA came out with a report saying, "aha, we've just discovered that natural gas supply is basically shaky." But there was never a mea culpa saying, "I'm sorry that we basically dumped all over the naysayers." And I think that they're doing exactly the same thing on oil. I just don't understand where they're coming from. But of course, we're all entitled to our opinions, and I'm sure they feel just as strongly that they know a lot more than I do – as I [feel I] know more than they do. [12:00]

JIM: They are also going to follow this up with a new one called *The Dawn of a New Age*, which is going to give the signpost to look for as we approach the plateau. But they are saying that plateau is decades away.

MATT: There's a very interesting number that I'm watching like a hawk. The Department of Energy's Energy Information Administration – the EIA – publish monthly global oil supply numbers. This is crude oil only. And it takes about 6 months before the adjustments level out – it's not perfect data but it's the best we've got. And then it looks to me like we start falling further and further away from the all time crude oil record hit in December 2005 – to put it just barely across 70 million barrels a day. That might actually be what we look back on and say, "well, that's the year that peak oil in the world actually peaked." So the idea that we have until 2030, I think has a credibility of about 1%.

Anything can happen. We can discover a new Prudhoe Bay tomorrow. But if we did, it would take a decade – and Prudhoe Bay being the largest oil field in North America, basically peaked at 1.5 million barrels a day and it stayed there for 11 years, and now it's down to 400,000 barrels a day. Even a Prudhoe Bay would basically be a drop in the bucket. You'd actually have to have about 15 of them. [13:17]

JIM: The other thing that strikes me too and you see this every single week in the oil markets that they wait for the inventory numbers. Let's just assume that these inventory levels – which nobody is taking with a dipstick – are true. The thing that strikes me is if 5 years ago we were consuming 10,000 barrels a day, and 5 years later we're consuming 20,000 barrels a day – those inventory numbers would be more relevant if they talk about days supply versus the inventory numbers themselves.

MATT: You're absolutely right. And it's actually even more complicated because now we have all these complicated boutique grades that you can't basically blend. So they all have to basically...it's a little bit like going into a grocery store

about 40 years ago when we had homogenized milk, and milk that wasn't homogenized that had a big slug of cream on the top. And so you only had to have a limited number of bottles of each. Today, you go into a grocery store and you've got about 17 grades of milk, so your inventory requirements have gone way up. And that's exactly what's happened in our gasoline supply; and it's also happening in our diesel supply now that we've just introduced this ultra-fine, less than 15 ppm Sulfur diesel.

And one of the reasons we had this big bulge in the Spring and Summer in gasoline first, and then diesel second, is that we were having to build up a brand new grade while we were still using an obsolete grade. And now we're basically liquidating the obsolete grade so fast – in the last 6 weeks we've never had a bigger finished product draw. So as I looked at the numbers that came out a week ago tomorrow from the EIA, our gasoline stocks are basically back to kind of right on top of the 5 year lows. But since demand is at a record high we've never had less gasoline stocks than the United States on a day's usage, and we're going into Thanksgiving weekend. [15:10]

JIM: Another figure I found rather striking and hearing the economists talking on Wall Street, they're talking about if the US economy slows down – as it did in the third quarter where we had 1.6% GDP growth – if we slow down, and we're the big economic engine, the rest of the world slows down, therefore there's going to be less demand for oil. But this is the first time I've seen in the last 5 years, we have really not had any demand destruction despite rising prices.

MATT: No, we've had none. What we are now starting to see, both in the United States and on a global basis, is the rapid growth in demand is ending because it can't be supplied. The United States, there were 3 months in 2006 we crossed 21 million barrels a day. My guess is that's probably the last time that will ever happen, because we just literally can't supply it. And what's going to be very complicated is figuring out the difference between looking at how demand growth is slowing down as if it's demand destruction, versus, a supply constraint.

The same thing happened in natural gas. When natural gas supply couldn't grow, then obviously use couldn't grow. And for a long time people said, "well, that's because the price is so high." And then the price collapsed; it didn't decrease demand either. Demand can theoretically be anything, but use always has to equal supply plus what you can liquidate from inventory. And my guess is we have liquidated our usable inventory down to as close to a just-in-time supply as you can get. We have a very tight market and it's likely to get a lot tighter before we'll ever see it loosen up. [16:43]

JIM: Why do you think we've had this disconnect then in the energy markets because certainly you see it in the PE multiples on the oil stocks despite record profits; you've seen it in the price of natural gas which got hammered this Summer when we didn't have bad hurricanes; you've seen it recently in the months of September and October with the price of oil coming down. And yet as the markets get tighter and tighter we're acting like there's this glut of oil that exists somewhere that nobody knows about.

MATT: It has a lot of precedent to it. If you go back a year ago, once the hurricanes had quieted down and it was clear that we basically didn't have massive shortages, oil prices briefly crossed \$70 a barrel, and they fell all the way back to the mid-50s. And as they were falling, the optimists were saying, "I told you so, that we were headed back to low prices here: here we come \$27 oil." They were just unbelievably shrill, and then lo and behold, a few months later we were back over 60, and a few months later we were back over 70.

And I remember the surprise of arriving out of contact in Italy for about 5 days and arriving in Ireland to give a talk at the University of Limerick, and they said, "well, what do you think of \$75 oil?" I said, "\$75 oil! When did that happen." – "Today!" And that was the middle of April.

So if you go back and you look at the astonishing climb from \$10 a barrel back at the end of 1998, all the way up to \$78 a barrel after the Prudhoe Bay pipeline disaster was announced – all along the way you have a sharp spike up, and then it kind of runs out of steam and it starts collapsing, and then it kind of settles, and then some other event heads it back up again. And all we're doing basically is setting new floors. So I think what we've now pretty effectively done is tested the 60 floor, and said, "Ok, the next time we have an event then the question is can we break the \$80 ceiling?" I've never been one to even try to imagine you can speculate the future movement of prices, but I think the reality is there is nothing out there that is likely to bring on a significant amount of new supply between now and 2012 and 2013. And that's a long period of time to go where all your risk is downside risk on supply. [18:56]

JIM: The thing that I find more astonishing, obviously supply has to grow to provide for it, yet the greatest source of new supply is going to be new discoveries, and discoveries peaked over 30 years ago.

MATT: Yes. It's been a long time since we've actually had a new virgin area discovered. In fact, the irony is the last 3 great areas to be discovered all happened between 67 and 69. They were Western Siberia, the North Slope and finally

the North Sea. Now, in the meantime, we have perfected the technology starting in the early 70s to basically go extend abilities in the ocean to produce oil beyond about 200 feet; and that ultimately led to the creation of deep-water, which was the last big supply growth. But if you look at the deep-water production which is on now, and the steep decline curves that happen in all of these deep-water fields after about 3 or 4 years of production, my guess is that we are probably now seeing deep-water production nearing its peak.

And then if we were lucky enough, let's say basically Congress in the United States came to their senses and said, "isn't it important for the future of our economy to get rid of all of our drilling bans, and start on a desperate search to see what we might have in 90% of our outer Continental shelf that's never seen a drill bit," and we found another North Sea. It took 30 years to build a North Sea up from zero to 6.1 million barrels a day, and in 7 years it's down 50%. So I think we've sort of run out the clock to introduce some form of viable new supply that could allow demand to continue their rapid path that's it's grown over the last 20 years. [20:53]

JIM: In one of your recent speeches you gave at the ASPO conference in Boston in October, you talked about these discoveries and you also talked about how you became really a data researcher looking into the data. Why do you think others are not doing the same thing you're doing? In other words, where does CERA get these numbers? Where do these optimists get these numbers, because obviously they're not looking at the same data you're looking at?

MATT: What I find interesting about the last 2 or 3 years of CERA reports is they all basically say "based on a detailed field by field study," and I don't know where they're getting the data. In the Summer, they came up with an unbelievably bullish report on the growth of oil supplies through I think 2013 or 2015, and they said it was based on 367 specific fields. I would be incredibly surprised if there are over 100 specific fields that are basically on the blackboard to develop that actually now have a name; and anything that doesn't have a name is just a prospect of what you hope will be a field. I hate to say... but they probably do have some proprietary [data]base, but then they don't want to share it with anybody.

Most of the other guys that I run into that we argue about this all the time are laden with theories, but what they're really devoid of is any specifics on facts, and I guess it's only because I am sort of a data nut that I happen to have just a ton of facts – a lot of the facts aren't perfect data but they're a lot better than no data. [22:08]

JIM: The thing that we're focused on right now is global warming which is caused, according to some experts, by the burning of fossil fuels. But if fossil fuel consumption is about ready to peak with peak oil, it seems to me the problem begins to solve itself.

MATT: If in fact that's the cause of global warming or climate change as I like to say. Again, that's an area I read with interest but I say, "that's someone else's issue." But ironically in a very insidious 'for all the wrong reasons', we do start to change significantly the CO2 emissions, other than the fact that it's going to be very encouraging to try to make up the gap in some of this stuff in the use of coal. And there's no question the use of coal creates unbelievably greater volumes of CO2 and other bad emissions than the use of natural gas or crude oil. [22:59]

JIM: The thing that strikes me, if you were to summarize this, looking at where we are today: we know that energy demand growth has been relentless – especially in Asia and India and emerging markets, and the United States; we've got declining new discoveries; we have growing regions now in productivity decline – just look at Mexico, and even Kuwait; lack of spare capacity which proves itself every time we have a disruption whether it's a terrorist event or an act of nature; we have maturing strategic assets. The energy infrastructure itself needs to be rebuilt – it's in disrepair; and today, you have a lack of people – I mean who wanted to become a petroleum geologist and work in the oil business in the 80s and 90s; we have a shortage of rigs; new projects – a shortage of those. It's like you point out in several of your speeches, there is really a disconnect between the data and conventional energy wisdom. I mean today we're looking at prices of oil below \$60 a barrel. In my mind they shouldn't be below 60.

MATT: No, and we're giving the stuff away. How the disconnect happens I don't have any idea – except for the fact that for the last 50 years, we all lived under the illusion that the Middle East was laden with so much oil that had almost no cost to it, that basically it was going to be a permanent ceiling on keeping the price of oil permanently low. And then I come along and stumble on to some databases of real research papers, and discover that was a myth too.

It hasn't been the first time, I liken back to the irony that all of us in our 50s and 60s and 70s kind of grew up under the illusion of the Cold War, and the illusion that the USSR was an economic superpower at least equal to us – maybe even stronger – and it took the wall coming down for all of a sudden everyone to realize, "oh no, they're actually a Third World country." It's amazing what the human mind has the ability to do to pretend and imagine. I guess it isn't human nature to basically just search for data first. I think you kind of have to have some sort of a whacky analyst bent, and I think luckily I just became that. But it does give you a very different look at the world when you actually start out with real data. And the

reality of things like the drilling rig scarcity and the people scarcity and the project scarcity – to start to say where are these optimists coming from? Oil field technology is a painfully slow process, and the blackboard for new technology today is as empty as it's ever been in the last 40 years. There's nothing being worked on. [25:38]

JIM: Given that, do you see any change? – I know we have this Congressional report that's supposed to come out I think the end of this month when they're looking into peak oil.

MATT: The GAO report. And then the National Petroleum Council has a massive effort going on that they tackled only because Secretary Bodman sent a letter last Fall saying, "I would really like a comprehensive study about peak oil," – that will be coming out sort of mid-way next year. And I think in both cases, who knows what the GAO report will say but I know when they spent an afternoon in my office about 5 months ago, they were asking all the right questions. We're slowly but surely getting smarter about the issue. And I think it's interesting to see how many people used to read an executive summary of a CERA report and would say, "Well, that must gospel," are now saying, "where are those people coming from?" [26:25]

JIM: Do you think there's any chance in the new Congress that begins in January that energy policy will change, or we'll get serious about this issue?

MATT: No. I'm kind of resigned unfortunately to a belief that we've gone so long, and it's so controversial, and it didn't matter who controlled the Congress that until we have a crisis we're not going to do anything. We're going to have to have an energy 9/11. [26:48]

JIM: We've been fortunate in the sense that if you take a look at the last 2 or 3 Winters, we've been able to avoid one of those 9/11s. I can't imagine what would happen if we had 3 weeks of continuous cold front on the East coast where we were drawing down natural gas storage that the reality of natural gas would present itself.

MATT: I'll tell you what NEP Pool – the New England Power Pool – [said when they] issued a warning a year ago last October, is that a 10 day to 2 week cold snap in the Northeast would likely induce a blackout because none of the utilities which are very reliant on natural gas had any supply contracts. And if the cold snap hits the Northeast it's likely to hit further South, and it'll be used up before it gets to New England. If we ever had a one week to 10 day blackout in frigid weather, I can't imagine the impact that would have on human health. I think we all forget you take an elderly person or a person who just doesn't have a very strong body, and leave them in a room that's 40 degrees, for a day or two – and it's just like floating in water, you get hypothermia just as effectively. And with a big area wide blackout, how we would evacuate New England would be one of the real crisis stories of the history of the United States. The fact that we were basically spared by the bell of warm weather, and then we basically casually used that opportunity to kind of get mad at people that warned that we had a problem is really amazing – and very discouraging. [28:18]

JIM: And when you see other countries that are building nuclear power plants or doing something serious about it, drilling as much as they can – look what China is doing in its efforts to acquire energy resources around the globe.

MATT: Yup, you look at the seriousness that the European Union is now taking when all of a sudden it has now dawned on them that Gazprom had nearly all of their fields in permanent decline, and yet Europe had blissfully relied on the next 20 years of their natural gas coming from Western Siberia because they had contracted for it. And now there's a genuine panic among the serious energy planners saying how fast can we build nuclear plants. And what we don't know about nuclear plants is first of all how energy much you consume in building a nuclear plant because it's a massive use of concrete and steel; and secondly, our reliability of proven, usable enrichment-grade uranium is skimpy as can be. [29:09]

JIM: And that's the other problem, too, because aren't we running large supply deficits in uranium?

MATT: Well, we basically worked off about a decade and a half overhang of weapon-grade nuclear waste which could be processed into usable atomic energy; and which is the reason why uranium prices have soared so much in the last couple of years. [29:29]

JIM: Now, one of the popular theories that you have going around in the financial world right now, the only reason that we have oil prices at \$60 or uranium at \$60 is hedge funds.

MATT: We do a lot of business with hedge funds, and yeah, I think hedge fund managers drive cars, but I don't think hedge funds actually consume oil. [29:51]

JIM: They don't consume it, but if they buy it, or if they're going into the futures market like that one hedge fund in natural gas – the theory is because they're buying it they're driving the price up. But really the demand for it – other than these hedge funds – isn't as strong as the price would relate.

MATT: The thing about energy contracts is it's a zero-sum game. For every buyer there has to be a seller. [30:14]

JIM: I would suspect since a lot of this takes place in the paper markets, people are just trading energy contracts, I would suspect if these guys went and started to try to take delivery on natural gas and oil it would be a different picture.

MATT: No, I don't think from the best knowledge that I've tried to get in this area and having from time to time having invested pretty actively in NYMEX contracts, there's no evidence that even 1% of the open interest ever hangs around at closing to take delivery. [30:46]

JIM: And so really what you have is just financial speculation and because of that, it's really distorting.

MATT: Yes, it creates the illusion of a price signal because we tore up contracts, and natural gas and oil prices have no idea of where they should be until the Nymex closes and then de facto that becomes the cash market because the traders know best.

JIM: Energy was hot until up about the end of August, the hurricane season was benign and so natural gas went down and oil went down – yet you have companies today that are selling at 6 times earnings, 7 times earnings. Matt, if you were investing in this area today, what areas would you be looking at?

MATT: First of all, because I'm the Chairman of an investment banking firm that deals only in energy we don't ever trade energy stocks, so the things that I invest in I look at as a private placement, and some of my holdings have gone back for 10 or 15 years. And I think the well managed service companies, they don't have an exploration risk. You get a global play. I think the big challenge for the service industry is by and large their asset base is just as old and rusty as the rest of the system. So there has to be a lot of cash flow spent in replacing the asset base and it's going to be tough hanging on to good people.

I think energy is going to be a lot safer place to invest in than a lot of other parts of the economy, but I also think that there's no safe harbor. And the idea that you can just throw darts at the energy business and pick a winner if prices double from here or go up 50%, even 25% - it takes some sound knowledge to make sure you're investing in the right type of energy stock.

And I guess I'd have to say if you wanted to basically ask where is the lowest risk? – It's probably infrastructure rebuilders, probably not the highest net return either. But if we don't rebuild our oil and gas infrastructure to the extent of at least 50% being replaced over the next 50 years then we're going to have the indignity of supply being down and deliverability being way further reduced than supply – just because you can't get it any place. And I literally see a 2 or 3 or 5 trillion dollar investment program rebuilding the energy infrastructure, and obviously that kind of spending creates a strong market for blue collar workers, and an enormous amount of wealth for somebody. [33:06]

JIM: This reminds me of back in the 50s with Sputnik. One day we said, "holy cow, the Russians are putting people in space," and we woke and then began this serious effort with engineering and R&D. It seems that we have to do almost the same thing here.

MATT: What we have to do is have the Sputnik event though. And unfortunately, I think that with all the unbelievable, overwhelming amount of data that I look at – CERA could be right, there might be a 1% chance of being right, but – the data so heavily argues that we should be preparing for supply to shrink. But I guess until we have a shock, we're not going to actually look up in the heavens and say, "oh my God, that's not a shooting star, that's Sputnik." [33:53]

JIM: And yet a lot of this infrastructure that you're talking about – whether it's adding to drill rigs, repairing them, making platforms in the gulf of Mexico that can withstand heavier weather, rebuilding our rail system – these are projects that you're not going to do this in a couple of years. They take time, so...

MATT: Oh no, they take a decade.

JIM: And yet that's something we should be doing now. So it seems like to me the sooner the Sputnik event occurs the better off we're all going to be rather than looking at the CERA report and saying, "that's great, I don't have to worry about that for another couple of decades."

MATT: You've expressed my sentiments a lot more eloquently and gently than I would have. [34:33]

JIM: Well, listen, I know you're just back from a vacation. I wanted to talk to you and get your take on the CERA report – this was only supposed to be 10 or 15 minutes but as always Matt, you're very gracious with your time, and I want to thank you for joining us here on the Financial Sense Newshour.

MATT: You're very welcome. You ask some excellent questions, and I think you're looking at exactly the right issues. I applaud you.

JIM: Well, thanks Matt, and all the best to you.

Matthew R. Simmons
Chairman, Simmons & Company, Int'l & Author, *Twilight in the Desert*
"Update on Peak Oil and Beyond"

JIM PUPLAVA: Hello, everyone this is Jim Ptoplava, I'm joining you from the Denver Gold Forum. Well, we've seen oil prices go from \$80 down to \$60, people are breathing a sigh of relief that the energy crisis is over, while others think this is just a temporary lull in the storm. Joining us this week is Matt Simmons, he's Chairman of Simmons & Company International, and he's also author of *Twilight in the Desert*, the bestselling book which is now available in paperback, and soon in German and Chinese.

Matt, I want to begin with the problem that has always faced the energy business in the past which is these wild price gyrations that we've seen. We saw it last September after the hurricanes, we saw it leading up to August, but I believe this time it's different, and unlike the past, prices aren't going to go much lower from where they are. Your thoughts?

MATHEW R. SIMMONS: First of all, I think it's astonishing that we could have created such unbelievable volatility in the world's largest natural resource, and in a system that we've all gotten to believe was so transparent and efficient we should have sort of a perfect market. And yet to have these wild fluctuations in oil prices – and natural gas prices, which make oil prices look modest – is very dangerous and in my opinion has destroyed any sense of price signaling that's one of the basic premises of efficient markets at work. And I think we're going to find ourselves in the near future right back to the same unbelievable tightness that we had 8 weeks ago because the market is as tight as a drum. [2:06]

JIM: People listening to this show when they think of energy and oil they think, "Ok, what am I going to have to pay for gas at the pump?" But a while back *National Geographic* did several issues on peak oil. One of them which caught my attention was a picture of this family on their front lawn with all of the products they make from oil: from shoes to deodorant to aspirin and bandages, to soccer balls.

MATT: That was a fabulous article.

JIM: I don't think most people are aware of how integral petroleum is to our daily life.

MATT: I think you're absolutely right. What's also interesting is that all of those individual things that were on that family's front lawn, actually only come from about 20% of the oil barrel, and about still 60 to 65% are transportation fuels. But it turns out that about 98% of all our transportation fuels in the world for both trains and boats and planes and vehicles come from oil. [2:59]

JIM: A lot of people have been surprised that we've stayed at these levels. I mean when it was at \$20 oil going to \$30, they said it was going back to \$20; when it went from 30 to 40, it was back to 30. Matt, how did this crisis creep up upon us? And I guess, what did the experts miss? I mean, we've had rising oil prices for about 4 years now, how serious is it and what do we do to fix it?

MATT: Well, I think one of the mistakes we made is we ended up with a body of people that we sort of called our oil gurus, which I think is an odd term to start out with. A guru is actually a spiritual guide leading someone in the Himalayas, as opposed to somebody expert. And so many of these experts had only one strong opinion, and that's where they thought oil prices would be. And I sort of watched this over the last 15 years, and these strong opinions about future oil prices, [and I said,] well, how would they ever know that? In the meantime, I really loved doing analysis of data and as foggy as some of our energy data is there is tons of data out there if you're willing to dig through it, [and it] basically started to point the way at least a decade ago that global demand for energy was on the march, and there didn't seem to be anything that would slow it down; and the prices were so unbelievably inexpensive that you couldn't even start to replace the industry's aging asset base which was getting very rusty. And at some point, we had the real risk of energy demand exceeding energy supply, and as pressures grew it was pretty clear to me that we should get ready for prices to be way higher than they were 10 years ago, 5 years ago, and ironically today. [4:39]

JIM: I would say that if there is good news on this issue the issue of peak oil is certainly getting a lot more public attention these days. I can't say it has gone mainstream but certainly you see it appear more frequently. On the plane to Denver I was reading *Scientific American* on, *National Geographic*, *BusinessWeek*, and other recent – in fact *Bloomberg Markets* this month. It seems to me the early peakers are doing a pretty good job of getting the word out, and I think your book helped a lot in that regard.

MATT: That's what I get told a lot and I think the only I can say is what the book did is it detailed in excruciatingly clear documentary data that we were living in a myth that the Middle East had unlimited amounts of oil that would be cheap forever; and that myth should have been popped 30 years ago. And once you get through shattering the belief that the Middle East will always have unlimited amounts of unbelievably inexpensive oil you then just have to do a quick tour around the world to say if it's not the Middle East where else is it, and the sort of magnitude we're now using it, and all of a sudden the concept of peak oil is far more easy to get your hands around. [5:48]

JIM: You know it's certainly gotten the attention of the US government, in fact, this November I believe the US Government Accountability Office – the non partisan Congressional watchdog – is due to release a study on peak oil. Matt, what do you believe think this report is going to say?

MATT: Well, I know that the guys that worked on it spent about 4 hours in my office, and they really seemed to be a very competent team, and they asked all the right questions. I'm looking forward to seeing what the GAO report says. It's also interesting that on the 7th of October, a year ago, Secretary Bodman sent a letter to the Chairman of the National Petroleum Council (NPC), Lee Raymond, asking the NPC to gear up and do an exhaustive report on every aspect dealing with this concept of peak oil. And finally, about the middle of June, the NPC sort of got their committees organized and they're plowing through a report – we'll probably have a preliminary public release of at the end of the year. And I think they're basically trying, again, to do a real honest job of saying, "what is this issue all about?" [6:51]

JIM: You know you even have, for example, Representative Roscoe Bartlett of Maryland who has formed a Congressional peak oil caucus to sound the alarm.

MATT: Yup, he's a fabulous public policy servant.

JIM: I just don't feel the US is prepared for this. I mean if you look at our transportation system to farming, the US economy – period – runs on oil and very little else.

MATT: Yes, we do. Yes we do. But you know we're not a lot less better prepared – if that's an awkward way of saying it – than Canada, or England or Europe. The world is unbelievably exposed right now to the fact that oil supply quietly starts to slip while demand still surges ahead, and that ends up sooner versus later leading to shortages – and then we really go haywire. [7:36]

JIM: I want to come back to the price gyrations for a moment because we've seen a number of reasons why, but the analysts and the economists are already out predicting that the oil prices have peaked, the bubble has bust...

MATT: Yep, they did the same thing a year ago.

JIM: And then you have wildly optimistic oil projections, for example, one of the questions I got from a lot of my listeners is make sure to ask Matt about this new Chevron Gulf of Mexico find which is optimistically projected to be as much as 15-20 billion.

MATT: 3 to 15 billion. I haven't seen anyone yet jump to 20.

JIM: Ok, maybe I was getting too optimistic there. You also have CERA making some very optimistic projections on new oil production coming online in the next 5 years.

MATT: Yup.

JIM: You know, if you look at that, if let's say you're a consumer and you see the price jump up, Ok, it's coming back down, you hear about these giant discoveries so to speak, it's not hard to see why, I guess, for many people they don't take peak oil seriously.

MATT: No, particularly when they then see or hear about the discoveries, they read on the news the sound-bites and then they see the oil prices collapse – yeah, it doesn't take a rocket scientist to say, "wow, I am so relieved that that turned out not to be a problem." In the meantime, it's a very dangerous price signal – particularly, let's go back to the Jack well, which is the name of the Chevron discovery. Chevron did a very professional job in my opinion of laying out the excitement they had that in one test well on a field that they found the presence of hydrocarbons a couple of years ago. They finally figured out how to do a flow test for almost a month, and based on that flow test from that one well they're willing to go ahead and drill more appraisal wells and they really hope that the Jack field might contain as much as 300

million barrels of oil. How that got translated into another Prudhoe Bay was saying, “gosh, if the 300 mile area of the Gulf of Mexico in this lower Tertiary rock formation that’s never been tested turns out to have about 50 or 60 additional Jack wells, it will be the equivalent of Prudhoe Bay.”

JIM: So this is just one extrapolation on top of another extrapolation.

MATT: Yes. And in the meantime we have a massive shortage of the type of expensive, complicated deep-water rigs that it would take to basically make even an elementary probing of this 300 mile area of the lower Tertiary. And on sort of a rough count, our analysts think it would tie up about two-thirds of the deep-water rigs of that water depth for about a decade to do that job. So it was a massive over-reaction. [10:12]

JIM: And even if, let’s say, it turns out to be just this one Chevron area, how long – when you have to test a well – before you can bring it to completion and then fully into production?

MATT: Well, what the senior Chevron guy said as recently as a program we were both on on NPR yesterday morning, is that he would have been basically far happier had they tested the well flowing for a year versus 4 weeks – that they just couldn’t economically afford to do that. And now they are going back to the drawing board and studying very carefully all of the things that they think they learned to figure out where they want to drill the next well. So they’re not basically being irresponsible, they’re being very excited that it shows in this deep formation that there really appears to be at least some presence of hydrocarbon. [10:53]

JIM: Well, let’s move on to something I also think is confusing for people, and that is: reserves versus production – because you hear talk about in the Canadian oil sands there’s about 175 billion barrels. Well, on the surface that sounds like another Saudi Arabia but will that turn into 10, 15, or 20 million barrels of production a day? – [that’s] another thing.

MATT: You’re absolutely right, it’s amazing how casually senior people in the industry, and senior oil ministers around the world, toss around their guess as to the amount of usable proven reserves we have in the world. There was an oil workshop in Vienna that OPEC sponsored two weeks ago, and there were 4 or 5 people tossing out numbers, “we think there are 5 trillion, 4 ½ trillion, 7 trillion.” And isn’t that amazing, they are talking about an absolute, just total guess. And no one is basically making the differentiation between fabulous, high quality oil flowing from highly pressurized reservoirs where you have the luxury of a single well that produces between 10 and maybe as much as 50 thousand barrels a day, and – let me give you a heavy oil example. It’s one of the great recent stories. Shell Oil Company had a project where they were going to expand their heavy oil sands production by 100,000 barrels a day, and as of about this time a year ago, they thought it was going to be a \$4 billion project. And then about 1 month later they announced it looked like it was going to be a \$7.3 billion project, and about six weeks ago, they said it looked like about a \$12 ½ billion project. And that’s for an upgrade of an incremental 100,000 barrels a day. [12:29]

JIM: I’m just going to come at this from a financial point of view, but in its simplest form, isn’t this peak oil issue something similar to an inventory issue? You start with ending inventory, or reserves, you add new additions or discoveries, which gives you the total available, then you subtract from that what you consume. I mean, in its simplest form isn’t it something similar to that?

MATT: What I think is far more important to track, and it’s hard to get good data on this, is all of the major oil fields in the world and how much they produced at their peak and how much they are now producing and what the average decline rate has been and is it accelerating or slowing down? And there are only a handful of areas in the world that you can get really good data. The North Sea happens to be the best data in the world. It turns out we still have less than 150 significant fields in the North Sea.

And it was easy as can be and took several hours of analysis at best to conclude a decade ago that the North Sea was very nearing a peak and would soon start into a decline. And the denial that came out of the operators of those fields, as I started making presentations on that, was amazing. And it turns out, in 1999, the UK and the region sector of the North Sea peaked at 6.1 million barrels a day; and this Summer they basically hit around 4 million barrels a day. Now *that* is peaking. [13:54]

JIM: When it comes to these new discoveries, last year, we only discovered 5 billion barrels, we consumed – correct me if I’m wrong, but – I think somewhere in the neighborhood of 30 to 35 billion barrels; we haven’t replaced what we’ve consumed for over two decades. That I think should alert even some of the optimists.

MATT: You’d think it would, but what’s amazing is they basically don’t seem to actually have time to get their hands around that data. And there are concepts still floating around called reserve appreciation that it turns out once you

discover something over time it's always way bigger. That was a byproduct of the 50s and 60s and early 70s. That hasn't been around for 2 ½ decades – except the thesis is still alive and well. And then there's always the hope that we've just turned out to have an unfortunate three decade period of bad luck, and around the corner there's going to be a fabulous new oil find some place, which when something like the Chevron discovery gets announced is why I think so many optimists jump to the conclusion that “wow, we've finally unlocked the door we knew was there to begin with.” [14:57]

JIM: I was reading the *BP Statistical Review* for last year, and I believe the countries – if I remember my figures – that were increasing production were somewhere in the neighborhood of 2.2 or 2.3 million barrels. But subtract from that the countries that were declining and their production was 1.3, so you had totally as a globe an increase in production – I think the figure was – 890,000 barrels a day versus demand of 1 million. I mean that's alarming, that's an indication.

MATT: John S. Harold [ph] in Greenwich, Connecticut just published a fabulous, interesting report last week of the 203 publicly traded companies that report their results, and every year they compile them in the E&P business – exploration and production business. And what they reported was that this group of companies spent \$277 billion on their capital expenditures program for exploration and production in 2005, up 31% from what they spent in the previous year. And they basically increased their production by 1% per annum, and increased their total reserves by 2% – at an expenditure of \$277 billion. It was also interesting that – these number are off the top of my head, but they are in order of magnitude correct – they spent something like \$35 billion collectively on exploration which was the lowest level of exploration in 5 years; and they spent about \$65 billion between dividends and stock buybacks. [16:25]

JIM: Well, that should tell you something.

MATT: That tells you something.

JIM: You know something else I think maybe that we don't understand here sometimes when prices spike and everybody's after the oil companies – one of the alarming things that I think a recent issue of *BusinessWeek* pointed out is that I don't think a lot of Americans understand that for example, 75% of the world's reserves are held by OPEC countries, another 10% by the former Soviet Union. That means 85% of the world's oil is outside our control. Now that in itself would be, or seem to be, a strong motivator to look for alternatives.

MATT: Yes, but you know, as long as people are willing to think that around the corner we have a return to unbelievably cheap prices, I think we are going to basically remain in denial until we finally have a shortage. [17:15]

JIM: A gentleman in the oil camp that is along your thinking in San Diego, Robert Hirsch, a senior energy advisor at Scientific Applications International

MATT: I was with him on a program in London last week.

JIM: He produced a report for the US Energy Department last year, and according to Hirsch the world needs to embark on a crash program 20 years in advance to prevent peak oil from hobbling the economy. Matt, in your opinion, do we have 20 years?

MATT: No. No. First of all, I think Dr. Hirsch has done a fabulous study, he's one of the more persuasive presenters I've ever heard, and what his point is: “Wake up, if it takes 20 years, don't argue about is the date next year or 5 years from now or 15 years from now, or 20 years from now – start today.”

There's an incredible amount of data that is starting to show that according to the Dept. of Energy's latest monthly statistical oil report, in December 2005, crude oil production which excludes natural gas, liquids and hydrocarbon processing gains, hit an all time world peak of just under 75 million barrels a day; and in the first 5 months of 2006, it declined every single month, and by May was down almost a million barrels a day. Now, if that trend continues for another 12 months, I think it will be fairly easy for people that want to be realists to say we actually peaked at the end of 2005. [18:39]

JIM: You know what I find even more remarkable today is that given how close we are to peak oil is to look how undervalued the energy sector is given the outlook that we may be eventually facing \$200 oil – some say \$300 oil. I mean where else do you find companies that are selling a product that everybody needs, at a high price, and are selling at 6 and 7 times earnings? I've never seen anything like this.

MATT: Well, it's a collective belief that this is all an artificial world that we are living in that reflects those prices – those are unsustainably high prices so they are not really 5 times normal earnings they are 15 times normal earnings 3 years from now. That's effectively sort of what the market's assuming. [19:20]

JIM: Why do you think in your opinion, Europeans and Asians have been more willing to reduce for example, dependence on imported oil: you had for example the energy crisis in the 70s; you saw France embark on nuclear energy after that 70s oil crisis; the Swiss are currently embracing a concept called 2000 watt society – a program designed to reduce energy consumption. Where are we?

MATT: First of all, one advantage that maybe the Europeans had is that basically their governments taxed their energy so much higher than us that they really basically have been paying way higher prices and the prices have worked. It was also a lot easier for those countries to basically create things like mass transportation. Now, with France and its nuclear issue that wasn't... – but all of Europe basically inherited a very viable railroad system that's now basically used to transport people. Europe's Achilles' heel is their highway system is now clogged with semi-trucks moving goods around Europe because they can't move on the railroad system. [20:24]

JIM: One of the things that I also think is creating a problem, and you've written on this numerous occasions and commented on it, is that our energy gauges are broken so that when people hear on Wednesday and Thursday the inventory numbers and you hear the analysts say, "boy, we've never had this kind of a supply." But as you and I have discussed in previous interviews, I mean people aren't out there with a dipstick each week sticking it in the tank.

MATT: Those have got to be almost entirely they're paying some clerk who's been given the assignment of "oh, it's Friday morning, it's time to basically email to the DOE our stock numbers, let's see what we think they've changed over the last week." And then we take those numbers, which are at the EIA's admission sampling of less than 50% of the total holders, and gross them up as an accurate reflection of the United States; and then analysts assume that that's a pretty good proxy for the world. [21:20]

JIM: Equally almost as absurd is how the oil markets trade off that data. You would think that the oil traders – and there's some pretty smart people on Wall Street – would say, "wait a minute, these numbers, we don't know if they are real or not." And yet you can see these large gyrations that we were talking about earlier in the interview all play off just because of some inventory number.

MATT: It's incredible. It's like a peak at a racing form of a race that hasn't happened yet. [21:45]

JIM: Another issue that if we were to move forward, let's say we start accepting that peak oil is real – especially if some of the trends you were talking about that have developed this year continue – describe the current state of our energy infrastructure.

MATT: Rusty, in a nutshell. The problem with our whole energy system is it got too old, while demand was still very young. Let me just focus on our offshore drilling rigs, because that's probably the most 'cannibal' unit of important assets in the industry, and of workable competitive offshore rigs we have about 500 of them in the world, and on average by the middle of next year they will be 25 years old.

The history of using offshore rigs beyond a 25 year life is real skimpy. I know a handful of people, including myself that actually have a 25 year old car, and in our case we've really tried very hard to maintain it well because it's a classic old Range Rover before they got Americanized, and basically it's a dangerous car to drive because it's 25 years old. I can't imagine the industry basically getting comfortable with using offshore drilling rigs that are 30 to 35 years old. And I can't envision anyway over the next 10 years we can make a dent on replacing even a third of our offshore drilling fleet. [23:03]

JIM: And weren't a lot of these rigs designed for times when the ocean temperatures weren't as warm so we weren't getting some of the kind of hurricanes and storms that we've seen through the last couple of years?

MATT: I don't actually know the answer to that so I would suspect that's right, but I think far more importantly they really weren't designed to envision that you would basically be doing not just into deep water, but then once you hit the drill bit into the earth going into deep formations. So the stress on the drilling equipment is far greater than they ever could have been designed for. [23:35]

JIM: Somebody asked – I was debating somebody on peak oil and we were talking about an issue and one statistic, and correct me if these figures are off, but I think it was 1985 we were consuming about 60 million barrels a day; our production capacity was about 70 million barrels. So we had this spare capacity of about 10 million barrels and then

refinery utilization was somewhere around 78%. Fast forward 20 years later, 2005, we're producing oil equivalent of about 83 to 85, production is not much over that, so you've got a spare capacity between 1 and 2 million barrels with 92% utilization rate. I mean those are some telling statistics in of themselves.

MATT: Another telling statistic that I think is a pretty daunting number is that between 1990 and 2005, global oil demand – exclusive of the collapse in the former Soviet Union which is a one-time event – grew by an astonishing 21 million barrels a day, during a 15 year period of time when most energy experts thought demand was peaking which is why we have no spare capacity anymore. [24:46]

JIM: And at the same time our discovery rate and our replacement rate was also declining.

MATT: Yes. If a high school senior class teacher just basically sat a class down and said let me spend an hour putting some numbers on the blackboard and you all tell me what you think they mean, I think you would get most people in a senior high school class in an average school in America saying this doesn't look very good. Which really raises a question, why are so many of our supposed energy experts so smugly in denial that basically these numbers don't mean anything? My single biggest puzzlement is where are these people coming from because I know what I do almost everyday I look at data and I analyze data? And it wouldn't appear that most of the great optimists have ever had any time to look at the same [data] because we're all looking at the same database – it's not like there are 5 different sets of numbers out there. [25:37]

JIM: You have described it, but if you look at this crisis we've got soaring demand, we've got loss of spare capacity, we've talked about shortage in the industry whether it's rigs, projects to drill, or people, and shrinking supply with depletion. I mean, I don't think if you look at that I mean that in itself tells you why we're at where we are today.

MATT: It's interesting to see from my perspective how finally a lot of the supply-side guessers are having to publicly throw some number out as to what they've assumed for the average decline rate of the existing production base because anyone hasn't figured that one out it's obvious their supply model is wrong. And most of the number that I read today are saying, "well, we think basically the net rate of depletion is 2% a year, 3% a year, 4% a year, maybe 5% a year." And then the CEO of Schlumberger last Fall comes out with a statement that "we, Schlumberger, believe it's basically 8% a year." It could be 10 or 12. We don't have the data, but it certainly isn't 2 or 3%. [26:48]

JIM: The other thing too is when you take a look at these studies whether you're looking at the government or the IEA, and one thing I think your book really got people thinking in *Twilight in the Desert* you talk about the fallacy of Middle East oil bailing us out. Yet, you can read it in the papers, the Saudis still say they can increase capacity. So you have the Saudis saying there will be more oil, you have Exxon-Mobil saying there will be more oil, you have CERA saying there's going to be more oil coming, and then you also have PEMEX and Chevron discoveries. So Matt, it's not hard to see why some people just aren't alarmed or are not taking this seriously.

MATT: I've been asked more than once, "who are your most vocal critics?" And I've said, "oh, gosh, just the CEOs of Exxon-Mobil, BP, Shell, the Oil Minister of Saudi Aramco, and CERA."

JIM: Well, I've pretty much covered them in there.

MATT: You did.

JIM: I guess one of the questions we got that somebody wanted me to ask you, is there anything out there that would change your mind or change your thought that peak is at the front door or inside the house? Is there anything like if you were to see Chevron or an Exxon come out and say, "here's a Prudhoe Bay," and then maybe a year later, two years later, BP comes out and says here's a North Sea.

MATT: Well, first of all, if we didn't have such a chronic shortage of drilling rigs and with the average age of the rigs so old, then you could envision some miraculous series of discoveries, and a fast tracking sort of effort that the industry has never had very much luck at trying to do. Let me basically give you a sort of best, best, best case. In some part of the world, maybe it's the Jack formation stretched across the Gulf of Mexico we discovered another North Sea. The North Sea basically took 30 years to build from modest production to peaking at 6.1 million barrels a day. And in the next 5 years it's already off a third. Is it remotely possible to create 6 million barrels a day in a decade from any new area and I'd say the odds of that have to be in the 1 or 2%. And since we don't have any spare rigs to do that, if you take the rigs that are now doing development wells off to do this new exploration you're going to have an acceleration of the decline curve. So we've sort of run out the clock. I would say that if some announcement we made tomorrow morning in that there was some revolutionary new product that was going to significantly reduce demand, then I'd say well that is actually going to

forestall peak oil. If we're going to have a relief today it's going to come through demand management as opposed to anything to do with supply in my opinion. [29:40]

JIM: So if somebody like Toyota could come out and say we've got a diesel hybrid that's going to get 100 miles a gallon...

MATT: Yup, and we have the plant already built, and basically we're starting to ship them to showrooms next month, and by the end of this year we'll have sold 40 million cars. I'd say, well, there you go, we're starting to wean ourselves from oil. [29:59]

JIM: I guess have you been contacted? As I look at the peak oil issue if I was General Motors, if I was a Ford Motor taking a look at this issue, peak oil; if I was let's say Boeing, that's building jets; or I was an airline – you know, if peak oil is at the front door inside the house you're talking about some major economic shifts in these kinds of industries.

MATT: Yeah, and I think it is probably one of the reasons that all of those energy intensive industries you outlined tend to basically glom onto what the major oil companies say with such a hope they've got to be right. [30:39]

JIM: Yes, because certainly airline tickets are getting more expensive.

MATT: My scenario for where we're headed with energy prices is literally a nightmare for the auto industry, a nightmare for the airline industry. I'm a little bit surprised since it's such a bad scenario that those energy intensive industries haven't kind of reached out with their best analysts to say, "maybe we ought to actually get together with some of these peak oil weird people and see if they have any idea of what they are talking about."

JIM: You know I think it was – is it Bakhtiari?

MATT: Yes, Dr. Ali Bakhtiari – a fabulous person.

JIM: He's given a speech to the Australian Senate and talking about this, they were talking in Perth for example, they're sort of preparing: they've got light rail systems; you take a look at how much is consumed in the transportation system. If this government report comes out in November, and let's say the government comes to the conclusion this is something we need to take seriously, do you think that could spark something that we would do on the demand side to get our energy or let's say our supply infrastructure changed?

MATT: I think it's going to have to. I've made a couple of sort of hunch predictions in the course of the last year, I'll be glad to share with you: that over the course of the next 12 to 18 months peak oil will actually replace global warming as issue number one that people in the United States and most other countries are worried about; and that the election of 2008 will be determined by which of the candidates has the most coherent strategy for how the world copes with post peak oil.

JIM: That is going to be attention getting.

MATT: This is one of those issues that have come out of left field and it's not going away and the data is going to get easier and easier to see, and it's going to get more and more compelling. In the background there's a strange issue that is far worse than peak oil – peak natural gas. [32:35]

JIM: And yet we're looking today, I think natural gas traded a little over \$4.50.

MATT: That's because we basically had the blessing in the United States of the mildest Winter we've had in years and no hurricanes during the Summer, and so we're going to have the luxury of going into the Winter season with storage comfortably full. But one of the things that worries me about the current way we've screwed up our energy markets is we literally don't know how to use a cushion anymore. And the minute we have any presence of a little bit of a cushion then the analysts call it glut and punish it by a collapse in prices. So it goes back to where we started – high price volatility has basically created virtually a brain-dead industry. [33:14]

JIM: Looking forward into this prediction of about 12 to 18 months – and I'm in agreement with you and I think as more and more people see that the price is not going from 60 back down to 30 or back down to 40, and that we're more likely to be testing 80, and then beyond that – let's say you were made energy tsar of this country, and you were given a mandate to something similar to a Manhattan project, prioritize if you would the steps that you would take first, number one, then two, three and four, that we should be doing now.

MATT: Great question. Basically, the steps aren't sequential. You have to do them all at once. But the most important step is to basically have a total data reform, and get some form of global governmental agencies to force the real data out of all of the holders, and so we basically once and for all skip to the bottom of this field by field production report. And anybody that basically wants to hide and say that's our own data, needs to be put on a list as they're hiding something. I think that's probably the single most important thing that we can do to end the debate because the longer we debate the more we basically aren't doing the right things.

Then we basically have to attack with a passion all the things we can do to basically help stabilize supply. As for instance, removing the drilling bans around the entire outer continental shelf of North America – that's an unbelievably important task – so we can start with the arduous task to try and figure out how much more usable oil and gas might we have close to home. Even though it's going to be a decade or so away. So while you're doing that we have to do the most amazing, explosive expenditures in energy R&D to try to find some new forms of energy that don't exist today.

And in the meantime, the only thing we can do in a 5 to 7 year period time that's going to make a difference is an enormous change in how we use energy, and make our society far less energy intensive. And what that's all about are some simple things like liberating the workforce and starting to pay by productivity, and let people work when they want to, and where they want to. And those that figure out a way to work close to home and get twice as much done get paid twice as much.

Step number two, is we need to take a deep breath and look very carefully about our whole food supply and how much of our food today comes from continents away that's unbelievably energy intensive to deliver and keep it fresh – and it doesn't taste very good. And we need to start growing food close to where we live; and we need to figure out some ways to basically redesign our buildings so that we're not using so much energy – basically to heat them in the Winter and cool them in the Summer. And all these things basically have to be done on a simultaneous basis because there's no single one thing that will make a difference. [36:10]

JIM: Now here's something that I think goes along with this kind of concept, what does this do to globalization? Because you have companies like Dell for example that may order raw materials from Latin America, have them shipped to Asia, they're assembled in Taiwan, maybe the box gets put together in China, it gets put on a boat, sent to Long Beach here in California, then put on a train and truck and shipped around the country.

MATT: Yup, it was a flawed plan.

JIM: So you're talking about bringing jobs back home and more local.

MATT: Yes. You know the flaw of the globalization plan – and I'm not talking globalization in the ability to communicate, I'm talking about exactly as you spelled out that we basically take everything that we buy and break it apart into the smallest unit and find the cheapest place in the world where you can build it because people are basically willing to work for 50 cents a day. The flaw of that is that all of those people's aspirations within a decade to be is to be getting \$10 an hour. So that was the first unsustainability of the model; and the second was the fact that we always have unlimited amounts of cheap energy to basically make transportation almost free. So globalization as we designed it just flat doesn't work. That's actually going to be the hardest one of the steps first though, because it takes the most time. So that's why I'm such a fan of liberating the workforce because you can actually affect that in a very short period of time. We've created all the tools through the internet and our wireless telephone system and so forth to really basically allow people, in a way high percentage of the jobs that we have today, to work any place they want to and be more productive. [37:50]

JIM: You know I guess if you look at peak oil, some people might be alarmed on it, but on a positive side if it brings jobs back home, if there's a lot of technology going into alternative energy whether it's more efficient building or rail system this is job creating. And you know it helps the economy.

MATT: One of the things that I should have listed in my priorities steps is we basically have about a 5 to 7 year period time also to totally rebuild our energy system before it rusts away. That would represent the largest construction project in the history of the world. And the jobs that would create would be so unbelievable that it would be easy to tolerate triple digit oil prices. The reality is the biggest danger that we have for the world is the sudden collapse of oil prices, and the higher they go the quicker they start to unlock the doors that get us out of this box. [38:38]

JIM: So I guess in a positive thing where right now we're all caught up on global warming and sometimes I call it issues stuck on stupid, that your prediction, by the time we get to 2008 it's going to dawn on people that peak oil is real and that party which has the most viable or workable energy plan is what's going to carry.

MATT: That's what it seems to me but I might be wrong. But with every passing quarter the data becomes more visible, and I can't imagine that by the time we're speaking the Summer of 2008 that there will still be an awful lot of skeptics about peak oil because I think the data will have been overwhelming. It's an event that's either on the doorstep or past tense. [39:22]

JIM: Well, Matt, I want to compliment you for putting up the hard fight and getting the information out there, because we need more people like you to bring people these facts. I know that *Twilight in the Desert* was a bestseller in hardback, it's now available in paperback. And talk about the international publication since we have an international audience.

MATT: Well, I'm pretty excited about the fact that in the first week in December I'll be in Germany for 7 days with a publishing firm there promoting the book.

And then I will be more excited to be spending the second week of January 2007 in China where the book is now finished and a fabulous team of Chinese scholars have done what I'm told is a beautiful job of translating a very complicated technical book perfectly into Chinese – and it will be published by the East China Normal University Press. And that to me will be one of the signal honors of my career. [40:17]

JIM: Well, I just want to urge our listeners if you haven't read Matt's book, *Twilight in the Desert*, it's available both in hardback and paperback.

Matt, as always, it's a pleasure to have you back on the Financial Sense Newshour – I hope again in the future you'll come back and talk to us.

Matthew R. Simmons
Chairman, Simmons & Company, Int'l & Author, *Twilight in the Desert*
"Tough Times Ahead for Energy"



JIM PUPLAVA: Well, energy prices are back on the front pages in the news stories today. Some think energy prices will stabilize, maybe they'll come down a bit, while others think we're headed for the perfect energy storm. To discuss this issue, joining me on the program is Matt Simmons, he's Chairman of Simmons and Company International, and he's also author of a best-selling book *Twilight in the Desert: The Coming Saudi Oil Shock and the World Economy*.

You know, Matt, the last time that we spoke was last August, and little did we know a few weeks later our whole energy infrastructure would be devastated by a good series of hurricanes. I would have thought that our hurricanes would have been our 9/11 or energy wake-up call, and yet I was surprised by the lack of response, and since then we've done very little. I believe we still don't understand the gravity of our energy situation.

MATTHEW R. SIMMONS: You're precisely right, and ironically you could argue that they were almost the reverse. There was this general sense by too many people that the only reason we have these temporary problems is because of these abnormal hurricanes. I'll tell you a very odd story. I was on a BBC global radio program and it was the Tuesday afternoon after Katrina. They had a senior professor emeritus from Erasmus University on, who's written a book called *Hydrocarbon in the 21st Century* [Peter Odell - *Why Carbon Fuels Will Dominate the 21st Century's Global Energy Economy*], and he claims we'll be using twice as much oil in 2100 as we are today because oil in fact is renewable.

And so both of us were asked, since oil prices were at \$70, do you think now this is the ultimate oil crisis? And the Professor said, "Oh, no, no, no – this is just a series of exogenous events, and within about 3 months it will all be corrected, and then oil prices will go to 35." He said, "Mr. Simmons, what do you think?" I said, "first, I don't know what 'exogenous' even means, but I think what Katrina did was actually bomb the Gulf of Mexico the same way [they] bombed Pearl Harbor. And we're not even through the hurricane season yet and I think we'll be very lucky if in 3 months we'll even know the extent of the damage. And I think it will be a miracle if we have everything fixed before the next hurricane season starts in the Summer of 2006."

And it turns out I was unerringly right, but the fact is that we had very funny oil statistics that came out when all of a sudden people couldn't drive, and we had no way to count barrels in the areas where most of the storage was, and it created the illusion the high prices had really brought demand down. And so we had a price collapse. [3:12]

JIM: That's absolutely amazing. Well, let's move forward if we can to today's headlines of record gas prices. Matt, how much of this is attributable to new government regulations on let's say, sulfur content, and last year's energy legislation requiring ethanol, and of course higher oil prices? I wonder if you could explain these changes and the impact they've made on gasoline prices.

MATT: The switch from MTBE to ethanol was, in my opinion, largely overlooked at such an unbelievably complex series of logistics we were putting on the system. And I wouldn't be terribly surprised if we are basically days away from having gas lines erupt in a lot of key places. But I don't think, so far, that's really been the driver. I think the driver of gasoline and diesel prices is crude oil, and the fact that crude oil is back up in the mid-70s. And the reason it's in the mid-70s, in my opinion, is we're out of capacity every place. So I think the switch to ethanol and coming right behind it is this unbelievable specification for ultra-clean diesel fuel is probably something that doesn't work. And that might be the triggering point for the same sort of gas lines we had in '79, but I think in the background is just the serious problem of the fact that this is just exactly where current prices should be if you think there's nothing abnormal about crude oil being at 75. And every time I'm asked how in the world you could justify \$75 price for oil, I say -- it's in barrels: \$75 happens to be 11 cents a cup. [There is] nothing we sell any place in the world for 11 cents a cup other than oil to refineries. [4:58]

JIM: In response, however, to these higher prices over the weekend, we have two Senators, one Democrat Carl Levin of Michigan, and Arlen Specter, a Republican of Pennsylvania, they propose a windfall profits tax, and in Specter's case anti-trust legislation, and some Congressmen are talking about price controls. What would these proposals do to alleviate our current energy problem, if not exacerbate them?

MATT: Well, the price controls is really stupid because then that basically artificially just encourages consumption. I think at some point I'm a little – I hate to say this because it's so counter anything I thought I would ever say – but to the extent that the major oil companies can continue to advertise that they're really not making much money, and that they're doing everything possible and that these are just temporary, and the cash builds up, and builds up, and builds up, and builds up, the governments of the world are going to basically take it away from them. Now, whether they should or not is a whole different reason, but I think had the companies been more forthright about and maybe they had done their homework a little better and said, "we are in a jam now and we're not quite sure how we get out of it," it would be easier to defend these prices. But what they've done is exactly the opposite, you know, "and this is just very temporary, oil's a cyclical thing, what goes up comes down, over 15 years we've spent all this money." And you know it won't be long before one of the major oil companies has \$100 billion of excess cash on the balance sheet. [6:29]

JIM: In the meantime, since Katrina and Rita, and others following – heck, we're already into a new season...

MATT: Yup, the one thing we'll know about the new season is that they've taken Rita and Katrina out of the hurricane language.

JIM: Since then, looking back however, we haven't built a refinery, we're not building wind turbines and we've done nothing with the rail system, are we committing energy suicide.

MATT: We're certainly playing a game of Russian roulette or chicken. Now, both of those games have actually created over the years occasional suicide.

JIM: When you sit, however, and look at the way this is debated, I don't believe the nation or many citizens understand how critical energy is to the economy, and the lifestyle we enjoy in this country from water, food production, technology to healthcare.

MATT: I've had the luxury of actually speaking in quite a few different places around the world over the course of the last 4 months and I would say that don't just blame the United States for our ignorance, we're basically just about as educated...last Thursday I spent a fabulous day at the University of Limerick in Ireland, and the question I got repeatedly asked, "why haven't people come here and told us this story? This is shocking!" And I got the same reaction in New Zealand, and the same reaction in Aberdeen, Scotland. So we basically got 30 years of very, very low prices that got lower and lower because they never rose. So an inflation-adjusted basis really led us into dreaming that we had the right to basically get energy effectively for free and we could worry about other things. [8:12]

JIM: From my chair it almost looks, Matt, that we're heading into a perfect energy storm. On one storm front you have supply versus demand; on the second, geopolitical issues. And then maybe a third storm front, a lack of a silver bullet, and even if there was something out there, it's the long lead time on alternatives.

MATT: Yes, and then you have all these flashpoints – the fact that the energy infrastructure is too old and it's rusting away. Each one of these things is a separate issue.

JIM: Describe the origins of this crisis. How did we get into this predicament?

MATT: Well, if you wanted basically to go back and say when the seeds were really started: they were started when I was a kid in the '50s, and the world began believing that the Middle East had unlimited amounts of oil that we had barely just started to find, and its costs were so inexpensive that our biggest problem was basically how do we keep the world from being flooded with too much of it. So we have some sort of diversity of supply. At the same time, we're finalizing atomic energy. There was a debate going on – and this was long before I can remember about it, I've just gone and read about it out of curiosity – atomic energy was going to be so free that it didn't actually warrant creating meters, the meters were way too expensive. Just give it to people for free.

So we kind of laid a foundation of an illusion that we could basically rely on effectively very expensive energy forever, and that the cornucopia of all cornucopias was in the Middle East. What amazes me is that it would appear to me now from a lot of feedback I've had that until I stumbled into the curiosity of finding these technical papers, and spent 2 ½ years working on what came out last June, and my book *Twilight in the Desert*, nobody had actually ever questioned the whole

card. We just basically assumed. And so many people assumed it. It was one of those things. There's no reason to ask how do you know that, because everybody knows it.

And then we made another egregious assumption or mistake – we created satellite TV, and out of that we let the whole world peek on how we lived. As a result China and India and Pakistan and Bolivia said, “I'd really love to live like those people in Canada and the United States do – and Europe. That really looks neat.” So we set the seeds [where] demand is going to grow forever and obviously we'll be able to supply it because technology is making supply easier and easier to do, and we've always got the Middle East. And the problem is that demand was too young and supply was too old and we were giving the energy away for free. [11:03]

JIM: Something that relates to this is I believe that a lot of economists, analysts or forecasters have missed out that by the end of the 20th Century, this energy miracle that we experienced in the latter half of the 20th Century – actually throughout the 20th Century – had become globalized at that point. So now we're dealing with emerging economic giants such as China and India – this is something that we didn't have to deal with, let's say in the '81 recession.

MATT: Oh heavens no. No, you're absolutely right. And I'll tell you what I don't find very amusing is how many of these name-plate economists say, “well, what we all missed was China,” because I love to remind people that I wrote a white paper in the Summer of 1997 called *China's Insatiable Energy Needs*, and I predicted that by 2005 that they would basically be using 6 ½ million barrels a day of oil – and that's exactly what they were. So, all you had to do was actually go to China and have your eyes open. [11:56]

JIM: Matt, if we were looking at the energy situation in the '50s and '60s, things looked pretty bright. Then we got a wakeup call in the '70s. Then in the '80s and '90s, the pendulum swung again to the bright side. Now, I think we're dealing with reality again, but this time I think it's more serious.

MATT: The wake-up call we got in the '70s was a fire drill that actually created the illusion that the only thing we have to worry about is a fire in the back office. And what I mean by that is it was basically we need to be careful if these dangerous countries in the Middle East don't artificially hold oil off the market. And as long as they don't artificially do that, we'll never ever have a problem. Whereas the *real* problem was the fact that basically in about 20 or 30 more years, their oil fields – unless they suddenly found any more – were going to be so old and they were going to go into decline. And no one ever took the time to worry about that. We actually got the classic ‘general fighting the last war.’ [12:54]

JIM: Now, in the '80s and '90s, we experienced an almost two-decade oil depression. How did this reshape the energy landscape and how did it change our thinking? I mean we went from an era of conservation to one of over consumption: cars got bigger and got less mileage; homes got bigger and were built further away from where people worked. How did that change the landscape in the sense of not only what we did economically, but maybe does that explain some of the thinking of oil company executives today?

MATT: Well, first of all, it codified several concepts in the conventional wisdom that turned out all to be wrong. The first was that we had a new suite of technology that was going to allow us to bring oil prices down lower and lower and people could be successful at it. And the technology meant that we had to drill fewer wells, so we didn't worry about the fact that we let our drilling rigs rust away; and we didn't worry about the fact that almost no new people came into the industry, because somehow we were going to do it through robotics, and GPS systems, and so forth. And literally there was some whacko people – there are still some whacko people – that are very prominent speakers that talk about digitized oil fields, and GPS systems and you know, satellites and so forth, and they're just absolutely Buck Rogers – they should become Jules Verne.

And in the meantime, [for] the oil companies the technology created decline curves that were far steeper than they had ever been before because they were basically pulling the harder crumbs out of the ground at a faster and faster rate. And we didn't find very many things of any size. And then because we were drilling fewer wells, we basically could end up very aggressively doing reserve estimations so you could kind of plug your F&D costs to your peers so you'd get the same amount of bonus. So we really went through a decade of imagining reserve additions. Had there not been this whistleblower at Shell Oil company in February 2004 who sent this big document kit to the *Wall Street Journal* and the *New York Times*, we never would have had this revelation that most reserves had been made up. The whole thing turned out to be a very unfortunate two decades where we dug ourselves in a very deep hole based on just one myth after another. [15:19]

JIM: Well, you know, a lot of those myths are still with us because out of the '80s and '90s we developed some pretty strong opinions that still exist today: that demand growth would slow down, that the cost of energy would get cheaper,

technology would solve the problem, and we had in reserve non-conventional energy which would become abundant and profitable.

MATT: Yup, and unfortunately non-conventional energy takes an awful lot of conventional energy used up to make it useable, so we're turning gold into lead.

JIM: Haven't the facts, though, disputed a lot of these assumptions and yet they still exist?

MATT: Well, you know, the problem is that there really weren't a lot of people that really had the time and inclination to actually doggedly chase down the facts, and there were an awful lot of people that basically loved to give the same talk because they'd heard it ten times so it must be right. And what's been going on in the last 2 to 3 years is the beginning of an enormously important debate between what are sort of euphemistically called the optimists and the pessimists. And I know most of the optimists. And I know most of the pessimists. The optimists don't have any facts. They have some firm hunches and beliefs. And the pessimists tend to be scientists who aren't necessarily very good communicators. People in the audience tend to want to hear good news anyway and a lot of these optimists are very humorous speakers. They make great jokes and then wise people say, "well, the real answer must be half way between."

But I have to tell you I am very encouraged over the course of the last year by the way the media has reacted. I think the media is doing fabulous work. I think there are at least 50 times more good speakers than there were two years ago on this subject who have done their homework. I think it helped that we ended up having a seven-fold rise in oil prices to start opening people's eyes. About 100,000 people have read my book, which I think has opened some eyes. I've had so many people compliment me that I'm really humbled by it, saying, "you know, whether you're totally right or slightly off, at least we'll never again just merrily assume that the Middle East had unlimited amounts of oil." [17:38]

JIM: The thing that sometimes surprises me when you turn on some of the financial stations you will hear an anchor saying, "how long will these prices persist?" And it's almost a belief that maybe the high prices and the spikes that we've seen especially recently, are somewhat of an aberration. Remember after Katrina when they spiked at '70, they went down the next couple of months. And every time we seem to have these spikes, they always retreat. So everybody says, "Aha, this is what will happen again."

MATT: Yup, and the oil bears, which there's still herds of, come out and say, "OK, I told you so." So that's why I'm encouraged by the amount of increase in the dialog – I'm really discouraged that we actually haven't had anything close to a listening to the alarm ringing, let alone a wake-up call.

JIM: Well given where we are today then what are the real questions we should be asking today, versus where the focus is?

MATT: We should be asking ourselves is it wise to ignore the reality of peak oil until it's too late to fix it? Then we should ask ourselves if we recognize the problem is either here or approaching the front door, how quickly can we basically work out some sort of a global cooperation agreement so that we really significantly change the consumption of how we use oil in the transportation markets, so we don't end up having a really awful tipping point. Now, those are the questions we ought to be asking ourselves. [19:11]

JIM: Yet, I get the IEA book every single year, and if you take a look at the government, the EIA [or the International Energy Agency], they all assume that the energy supply will be there to meet future demand.

MATT: I know. They have accidentally become cheer leaders for peace in our time. I've gotten to know quite a few of these people, and sadly enough I think they actually believe what they say. I think it would maybe I guess a little bit more comforting if they know that that's not right, but they are just paid to say that. [19:42]

JIM: You know what'll happen, and this happens with the optimist camp, they will cite these numbers of where future demand is going to be, and future supply is going to be there as well. And somebody with that kind of authority, you know to somebody that may not be familiar with all of this, that is almost very soothing.

MATT: It's very soothing. But again, I have to say that I might be hallucinating, but I'm winning the PR war right now.

JIM: Well, you know, the one great thing I would say is [with] books like yours – *Twilight in the Desert*, which is an eye-opener and if our listeners have not read this book I highly recommend you pick up a copy – there are a plethora of voices however that [say] peak oil is a distant issue, and we've seen them on television this week.

MATT: I know all of them, but they'll probably actually argue that until we go over Niagara Falls. But on the other hand, you know, there are precedents of this. If you go back and look at the history of...what's really amazing is the weekend before Pearl Harbor, World War II was basically 25% over, and there were still people passionately saying the United States will never be at war, because they didn't want the United States to be at war, it was inconvenient.

JIM: Just as peak oil.

MATT: Yes.

JIM: But what are executives thinking? I mean, I saw the January automobile shows. I've seen General Motors talk about a new lineup of SUVs, and the irony of the recent spike in gas prices they were – I think it was CNBC – interviewing some consumers and here's a guy putting gas into his SUV and he's upset about the price.

MATT: Yes, but you know, you've got to remember that sticker shock is totally different than prices really being high. And it was so interesting to come back from this trip to Italy and Ireland and see that they're basically paying close to \$7 a US gallon. And they're kind of annoyed, as we are, because they would think it ought to be \$4, which it was a couple of years ago.

But again, I continue to always convert it – because it is just so easy to – back into a cup, because if you go and order coffee, tea or wine or water, you basically buy it by the cup, and when you're paying \$3.20 a gallon in the United States is 20 cents a cup. And 45 cents of the \$3.20 is taxes. Can you name me anything you can buy for 20 cents a cup anymore, other than gasoline?

JIM: Nothing.

MATT: And then when you say \$75 a barrel – 11 cents a cup – refiners are the only purchasers in the world that can still buy valuable things at 11 cents a cup. I was asked in Ireland, "what do you think oil should sell for?"

"Well," I said, "for the things that you think are dear. What do you pay for Irish whiskey?" I think basically the answer is on a per barrel basis about \$4,000 a barrel.

JIM: If you look at it a six-pack of Coke, it is actually more expensive than if we were to take equivalent of gasoline.

MATT: Yes, a cup of gasoline sounds so trivial, but the reality is if you have access to a passenger car, you can basically get six people in it, some stuff in the trunk, and go two miles for 20 cents. Have you ever tried to negotiate with a guy on a donkey and a cart: "will you take me and my five friends 2 miles for 20 cents." That guy's going to swear at you for being stupid.

JIM: Well, why don't you give us a run down on some of the cold hard facts, and this is something I really want to get to, and you do a good job of this in *Twilight*, regarding reserve additions and production profiles of the major producing countries because one statistics you will hear the optimists throw out continuously, "well, we have 175 billion barrels in the Canadian tar sands."

MATT: Yup, it's too bad we even have reserve data, because it's so meaningless, and it's so unreliable, and it doesn't tell you anything about how much a country or company can produce in the next 2 to 3 years. And any time you start commingling light sweet oil that can come out of a pressurized well bore – one well bore – at the rate of 40,000 barrels a day, or 10,000 barrels a day with heavy oil from Canada [where] it costs you \$10 billion per 100,000 barrel a day production, you're really commingling Maseratis with jalopies, and some are saying, "I have a thousand vehicles." It's used all the time by the optimists and they don't have any idea what they're talking about.

What's really also interesting is how little data we have of any quality about how much we have left of high quality sweet oil. And the answer is most of the key crude grades are basically now very tiny in their volumes. What we've made it up with is basically a lesser rating quality of crude that has a higher degree of sour properties in them, and poisonous gases and is also heavier. And what we're doing in the heavy oil is chewing through natural gas primarily as a heat source and potable water too often to create steam to melt it into basically low quality crude. And that's where I say, "Gentlemen, we have just turned gold into lead." [25:07]

JIM: You know it was interesting after our interview last August, and having read your book and talking about the very likelihood of peak oil being upon our front door, we saw last year that Kuwait's Burgan field, and Mexico's Cantarell field peaking. Aren't these examples of the first canaries starting to sing?

MATT: The day that the Chairman of Kuwait Petroleum Corporation announced that the great Burgan complex is exhausted that's six decades of 2 million barrels a day, I said, "that's the first canary in the mine shaft starting to sing." Cantarell, that's a very serious issue for the United States. Because if Cantarell has finished, wrapped up, over its tertiary recovery program, we don't have a term in the oil for 'quadrutary' recovery. So, it's over. And if that actually falls to anywhere nearly as low as 500,000 barrels a day by 2009, Mexico will not be exporting oil to the United States, and that puts Hugo Chavez in an unbelievably powerful catbird seat to dictate terms to us as to the conditions under which he will sell us his heavy oil. [26:21]

JIM: The frightening thing about all of this - and you've used several analogies about our energy gauges are broken, despite being the largest industry in the world - the energy industry - it lacks transparency, something you have argued for a long time. But most people would be surprised to learn that most petroleum stocks are mostly computer guesses.

MATT: Yes - petroleum 'stocks' being inventory versus equities. We don't have a fuel gauge that basically says, "oh, we're almost empty."

JIM: That's kind of scary. Let's say if you've got your buddies, you have 5 or 6 people in the car and you're going across the Arizona desert and you have no idea what your fuel gauge is saying.

MATT: Yes, it's interesting. At various times when I've been speaking at fairly large groups I ask a question, "is there anybody in the audience that's run out of gas, please raise your hand." It's amazing but about 75-80% of the people in the audience always raise their hand. Almost everyone has had the indignity of sooner or later forgetting to look at the gas gauge and running out of gas. And you can be driving 75 miles an hour and one second later your car stops. We have gauges, but we forget to look at them. Here we don't have a gauge. [27:31]

JIM: That's a real problem if you take a look at any forecast for economic growth whether you're talking about China, India, the United States, Europe, it's all based on increased energy consumption. So if you're talking about everything that we need for the necessities of life whether it's growing food or getting basic goods to the stores that all requires energy. What happens when that energy isn't there, or you can't get enough of what you need?

MATT: Well, what happens is basically what we need disappears. See, that's the irony. We'll never run out of oil but we can easily run out of food on the shelves, and cars on the street, and it doesn't mean we've run out of oil. It just means that we have no more *useable* oil in the system. When you run out of gas in a car, it doesn't mean there's no gasoline left. It's just you don't have any gasoline in your tank. [28:24]

JIM: Do you think, given these circumstances - I mean if you take a look at energy being on the front pages, the President mentioned it in his State of the Union message and he gave a major speech today - is this a growing recognition by Washington and the politicians that this is a serious issue that's not going away?

MATT: I certainly think it is. I think history will actually remember President Bush's State of the Union [where he] mentioned that it is time for America to end our addiction to oil, as one of the really major turning points in the thinking process of the United States of America. I'm not saying that from a partisan standpoint. I'd say the same thing if that had been said by President Clinton. [29:07]

JIM: I want to move on to something that is very difficult to assess or even predict, and that's an aspect of energy which is geopolitics. I can think of several flashpoints - Middle East, Nigeria, Venezuela, the Straits of Malacca - just how vulnerable are we to a sudden supply disruption?

MATT: If we had 5 or 6 or 10 million barrels a day of spare shut-in capacity, the answer is not really, not very vulnerable. But the fact that we don't have any spare capacity [makes us vulnerable]. Now the Straits of Malacca shutting down is a showstopper. That's 11 million barrels a day of oil flows that basically allows oil to go from the Middle East and Africa into the Eastern Asian markets. If MEND [is successful], which is the movement to emancipate the Nigerian Delta, they've already shut in 650,000 barrels a day of Nigerian oil, and they're going for all of Exxon's next. They've publicly announced that. Shutting 2 million barrels a day of Nigerian oil that's really high quality, light oil and it's a very short distance by tanker from the Niger Delta to the Gulf of Mexico, so that's another enormous vulnerability. If Mr. Chavez realizes that Cantarell really is now in decline and he announces, "I just don't quite like the rich people in the United States. I'm willing to supply

the US with oil, but only if they can certify that they've given it to the poor." He'd become so popular throughout Latin America you couldn't believe it. These aren't all kind of Stephen King novel events. [30:43]

JIM: I'm never surprised when I turn on the TV. In fact I was reading – trying to think of the gentleman's book on oil – and he was talking about in the chapter an attack on the Saudi oil facilities in Abqaiq, and the next morning I get up and I turn on the TV and there it is on the news.

MATT: It's a very vulnerable facility. And what's interesting is the good news is they killed the people in the cars, but two of the security guards also got killed. And the fact that they apparently breached the first gate was interesting.

JIM: Each kind of event it seems like they're getting closer and closer.

MATT: Again, let me tell you an event that would be not terribly difficult for some whacko person to pull off, take a pick up truck and fill it with the same sort of energy that the guys did in Oklahoma City, and park it under the Alyeska pipeline. We have so many fragile choke points today that any of them now matter because we don't have any spare capacity. [31:48]

JIM: Well, given this, how would you describe where we are today in terms of peak oil and gas? Is it approaching the front door, knocking at the world's door, or is it now inside the house?

MATT: I think now the more I've had a lot of time to get educated about this issue, the closer you get to approaching this is the highest we can produce, the more dangerous it is to produce at that rate. And the safest thing to do is lower your rate of production so you actually don't have a precipitous decline on the other side. On that standard, I would basically say that peak oil is now inside the front room. And peak natural gas is right behind it and is far more serious and will decline faster than oil because gas is a vapor. [32:32]

JIM: Don't we have a problem of what remains is in stranded areas? In other words, the United States has gotten a lot of its gas through pipelines from the Gulf of Mexico through imports from Canada. But if we were to continue, we would need to liquefy it, put it in a special ship, and create a special loading dock to receive it (or LNG terminals) and we don't have enough of them.

MATT: Well, most of the stranded gas we have in the world is of the same quality as the almost unlimited amounts of oil in the Middle East – it's an illusion. It has not yet been discovered, and we should basically not be calling undiscovered gas a usable energy source. You can call it a theoretical energy source, but until you actually drill wells and drill a lot of appraisal wells and then core the wells so you know what the rock properties are, you have no earthly idea of whether you have usable energy or not.

JIM: And yet here in Southern California we're building an LNG terminal south of us at the border which is the only place you can build them in California.

MATT: It's a field of dreams: build me a stadium and the team will be there.

JIM: I want to come back to your book *Twilight in the Desert* where you talk about a lot of the larger producers have all peaked, recent evidence with Mexico and Cantarell, even Kuwait with Burgan. In your research in *Twilight* you're talking about this approaching peak, it seems like everybody – whether you're looking at the EIA or the IEA – looks towards Saudi Arabia, and yet I don't know maybe they believe this themselves that they're going out and say, "well, we're going to invest this much, and we're going to take our production up to a certain level," but I get from reading *Twilight* you doubt if that's possible.

MATT: Well, first of all, it is *not* possible. I've had the luxury now of an enormous amount of feedback, including some really senior people within Saudi Aramco that have had the guts to say, "I really love reading your book, you accurately described the unbelievable challenges we're dealing with." I think part of the problem that some people there have is they've heard for so many years through our experts that they can produce 25 million barrels a day, that they say, "Pssht, sure we can, everybody has told us that." [34:47]

JIM: Whether they can do that and taking a look at their difficulties, but these are some serious assumptions I think that...

MATT: There are some unbelievable assumptions. When you have gentlemen like Dr. Sadad al-Husseini who has his PhD from Brown University, and he was Executive Vice-President of Saudi Aramco in charge of E&P, and Dr al-Husseini and I have been on two programs together in England, and he's been quoted in the English papers as saying the West is

deluded to rely on Saudi oil. He's basically said, "over 12 million barrels a day, it just isn't in the cards." And he was known in the '90s as the brains of Saudi Aramco, and he's a fabulous human being. [35:30]

JIM: Let's go to the optimists' arguments for a minute and just show how serious this is. I wonder Matt if you would give us a quick rundown of the alternatives: tar sands; nuclear power; wind; solar; clean coal; and biofuels – which are in the headlines.

MATT: The first thing that the optimists rely on is that we always have had reserve appreciation, and so fields over time always get bigger. That happened 50 years ago. There's not a scrap of data to support that concept for the last 25 years. It's just wrong. The second concept is embrace technology. All you have to do is be a believer in technology. I continue to remind people that all the oil field technology we're talking about was being invented in the early '70s when our firm started business. It took a decade to invent it, it took a decade to commercialize it, and it took 15 years to spread it around the world and the blackboard's bare. There is no more technology of any significance that anybody is working on. So then you get into: look at all the unconventional oil we have that is now commercial. You can make money – if you've already paid for your facility and written it off – on oil sands, but oil sands are very different from tar sands. The oil sands can be strip mined and they're still extremely energy intensive, but tar sands need to have these deep mine shafts of steam put in to melt the [tar] – it's really basically bitumen, a recycle of La Brea tar pits – you chew up such an intensive amount of energy. And what they're talking about is undiscovered natural gas in Northern Alberta, and potable river water from the Athabasca River, that to use either one as a steam source to create low quality oil is a crime.

And then they basically talk about – assume – all this stuff we're basically going to discover, and I say, "you know, give me a break, Cantarell in Mexico was discovered in 1975 and 1976, that's the last giant oil field we've ever found. Prudhoe Bay, the North Sea, and Western Siberia were all discovered in 1968, and that's the last time we found a large or medium onshore oil field in the Middle East." 1968 was a long time ago. [37:44]

JIM: What about, for example, Mexico announcing that they discovered a giant oil field, though we don't know much about it.

MATT: They don't know much about it because there's been one well drilled and they haven't yet cored it. You see until you core a well -- which is really basically a very technically tricky process of going down to the level of the earth where you think the oil rocks are productive, and literally cutting a core, and retrieving it and sending it to a laboratory, and saying let's test the porosity, let's test the permeability, you don't know anything about the reservoir rocks and whether they will flow oil or not. Until you flow test the oil, you know nothing about whether it's highly free flowing or very, very syrupy molasses. So, drilling a well is an important first step, but until you well test and core, you're basically just guessing. [38:44]

JIM: What about biofuels?

MATT: There are probably some biofuels that are really good potential solutions, but any biofuel that has to be planted every year is by definition taking a lot of nutrients out of the soil. Unless you're using very, very cheap labor, you're using a lot of energy in your tractors and a lot of energy in your fertilizer. Now take sugarcane-based ethanol in Brazil for instance. They basically don't uproot the cane. They have cheap labor with machetes that hack it, so that's actually pretty energy in-intensive. The work that's being done on switch grass, which is this fabulous grass we sort of plowed up in most parts of the Midwest that covered the Great Plains and at one time fed 100 million buffalo, as long as you're not grazing it with buffalo, it grows between 6 and 8 feet in the peak of the season. You cut it with hay machinery, so it regrows the next spring. There's a lot of promise in those types of fuels. But what we're doing is we're promoting things basically for the sake of subsidies and being callously ignorant of the energy intensity. What we can't afford the luxury of is creating a whole new suite of energy products that are net energy losers. [39:55]

JIM: How would you describe corn ethanol?

MATT: Net energy loser – big time.

JIM: And yet that's what we just passed and that's the direction we seem to be going in.

MATT: Yes, and the corn lobby is a very powerful lobby. They love the subsidy, but I think it's time to kind of get off that stuff.

JIM: Given where we are and what you know, what should we be doing now?

MATT: Getting as educated as can be on how serious these issues are. Getting as educated as can be on how inexpensive energy still is. Start thinking through all the ways we can rapidly reduce the intensity of how we use oil and gas, so that we make sure we don't basically waste it unnecessarily. Go on an R&D program the likes of which we've never done to create some new forms of energy. But I think that won't happen soon enough.

So we really have to adopt a big conservation plan: liberating people to work wherever they want to, and when they want to, and pay by productivity, could be one of the really great sort of social revolution things that we do in the next 5 years and basically eliminate all the people in places like California and Texas, for instance, who are spending upwards of 4 hours a day crawling to work in traffic and crawling home so they're mad when they get to work, and they're mad when they get home, and they were mad when oil was free. Eliminating our kind of compulsive obsession with having exotic food from all around the world in our supermarkets every place 24 hours a day, 7 days a week, 365 days a year – it's too energy intensive. Growing stuff at home and canning it. And what we really need to do is ultimately reverse this concept of globalization and go back to actually living in what are euphemistically called villages close to where we work, which can be downtown, but it's just not 3 hours commute. [41:42]

JIM: What about the rail system?

MATT: The rail system needs to be totally overhauled and totally rebuilt, and use the rail system to ship goods and people but in shipping goods only do it as far as you can ship goods to water, and then get goods on marine based transportation, barges or vessels, and use our water system as the way we basically deliver goods as close to where the kind of end point is – sort of like Federal Express does. And we can actually do all of this stuff. I mean if we applied this on a global basis with the same intensity as we had to build the war machine for World War II, we could get this done in 5 to 7 years. [42:24]

JIM: Do you think it's going to take a crisis to launch that?

MATT: Sure it is. Go back again to where we started. If Katrina and Rita weren't even looked at as they were flashing yellow lights, it's going to take a crisis.

JIM: That's what I fear, Matt. I fear we're heading into this perfect energy storm because it's like we're sitting on the shore, and the sky looks blue, the winds are picking up but about 10 to 15 miles offshore, beyond sight, there's a hurricane.

MATT: At least there are a lot more people in serious places that are starting to think through than there were about by a huge measure a year ago. But to galvanize the whole system, I think we're going to have to have some form of an energy 9/11.

JIM: Any final thoughts for our listeners? Let's say if there's some skeptics in the crowd because you know we hear stories about abiotic oil, and there's just a naturally gooey center in the middle of the Earth that replenishes every well in the world, I can't help but think in terms of that argument that if you were ExxonMobil sitting on that cash that if there was a gooey spot in the earth somewhere, you would be going after it.

MATT: If the abiotic oil theory worked, why didn't it ever refill any of our depleted oil fields? I think that we have basically created a fool's paradise, and it's really time for the fools to wake up and get real because this is actually something that could really destroy our lives, and not our kids' lives, but our lives. But it doesn't have to happen that way. [43:53]

JIM: It goes back to something you said mid-way in our conversation: it's not at the front door, it's inside the house. Matt, your book *Twilight in the Desert* did a lot to open people's eyes. When's it coming out in paperback?

MATT: In about a month, and also exciting for me is in about 2 months, it comes out in Chinese.

JIM: And the 100,000 copies that have sold globally, which is incredible, what are the sales overseas, has it been as popular there?

MATT: I don't really know, all I can tell you is on Friday afternoon and I went into my favorite bookstore in London Hatchards, and I couldn't believe as I walked up the stairs to see a 'hot items' [list] with *Twilight in the Desert* at the top, so I introduced myself to the guy at the desk, and he said, "come up stairs and sign the ten copies we have on the shelves," and we got there and they were gone, and he'd just filled the shelves up on Thursday afternoon. He said, "we're having people come in and buy this book five at a time. I can't believe you wrote it." You know, for a book that came out in the

middle of last June, it's pretty good news to me. Wiley has decided they're going to continue publishing the hardback even though usually when the paperback comes out publishers sort of wind up the printing effort on the hardback. [45:06]

JIM: All I can say to my listeners is if you want to get educated, Matt's book is certainly one of the top of the list because it opens up your eyes whenever you hear about oil being bountiful in the Middle East. Matt, I know you're a busy person and you have to get off, but I want to thank you as always for giving us a good deal of your time and joining us on the Financial Sense Newshour.

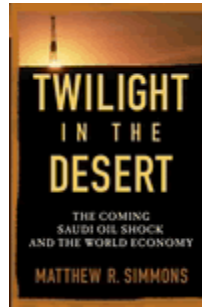
MATT: Well, thank you for the opportunity for being on your program. I enjoyed the conversation last Fall, and I enjoyed it again today.

JIM: Alright, and all the best to you Sir, and may you sell another 100,000 copies.

Matthew R. Simmons

President of Simmons & Company International

Twilight in the Desert: The Coming Saudi Oil Shock and the World Economy



JIM PUPLAVA: Joining me on the program is Matthew Simmons. He's Chairman and Chief Executive Officer of Simmons & Company International, a Houston-based investment bank that specializes in the energy industry. Mr. Simmons serves on the boards of Brown-Forman Corporation, The Atlantic Council of The United States, he's also a member of the National Petroleum Council and The Council of Foreign Relations. He has an MBA from Harvard University. And he's here to discuss his new book *Twilight in the Desert: The Coming Saudi Oil Shock and the World Economy*.

Matt, I want to start out the discussion from the back of your book in Appendix B. Several years ago you did a study of the world's major oil fields. What did you find?

MATTHEW SIMMONS: It was really an incredible exercise of trying to collect the data no one had ever actually thought of doing before, and that's, what are the top oil fields in the world – field by field. And the background for me doing this is that I've participated 2 years in a row in an energy supply workshop, conducted by the energy analysts of the CIA in Washington, where they got about 10 of the best oil experts together, and we'd spend a day doing a discussion of all the key countries, and how much oil capacity they had in place over the course of the coming 3 years. I sat there listening aghast at all of these experts with their laptops that kept looking at their supply models, and it's how China will be producing 3,217,000 barrels/day this year, and 3,281,000 barrels/day. And I basically said: "how do you all even know that. What are the 3 or 4 top fields in China?" And no one had any answers.

So I decided it would be interesting and educational to see if you could actually put together a list of the top 20 oil fields by name. And I thought somebody must have done this before, and the more I dug the more I realized that no one ever had. So I basically decided – arbitrarily – 100,000 barrels per day [bpd] production was my cutoff of what constituted a giant oil field and all Fall of 2000, I believe this was, I basically took data from various areas and kept trying to hone in on the total list, and I decided once I got it done, I would circulate it widely to the 4 or 5 or 6 hundred people who really ought to know the areas a lot better, and that would flush out the real data. What I came up with was finding that there are about 120 oil fields in the world that still produced over 100,000 bpd, and that they collectively were 49% of the world's oil supply. What I also found is that the top 14 fields that still produce over 500,000 bpd each, were 20% of the world's oil supply, and on average they were 53 years old. The next thing I found was that in the Middle East you had basically, somewhere between 3-5 oil fields in each of the major Middle East oil producers that made up about 90% of their supply – and until I did that I had just assumed the Middle East had hundreds of oil fields – and all these oil fields were old. And then what I found was – because we made it clear that anyone who wanted a copy could get one, but the caveat was that if you have any better information, let me know – I probably shipped over a thousand of these copies out to people and I had about 5 responses of "here's a field you missed, here's a field you misspelled or here's a field you said it was producing X, and I believe it's probably producing Y." Only about 5 responses, out of over a thousand people who got this. What I got from hundreds of people was "this is amazing, I've never thought about this before." And these aren't just sort of random people, these are people that are all passionate energy analysts. So that gave me the background, when I finally had my only trip I've ever taken to Saudi Arabia. I knew ahead of time that they had these 5 key fields that must still be producing 90% of their oil, and it was that knowledge and data that allowed me to just peer into presentations we were having, so that I came away saying, "you know I really wonder whether in fact we're sitting on an illusion that Saudi Arabia has all this vast amount of producible oil." And I also then had an idea of what issues I should start trying to research, and within months I had discovered this phenomenal database of technical papers at the Society of Petroleum Engineers, that I spent all Summer, two years ago in Maine, plowing through, and it was at the end of that exercise that I decided I was going to write a book. [5:24]

JIM: It's incredible, because every energy supply model starts with the assumption that Saudi oil is plentiful. It's inexpensive to produce and supply can expand to meet demand. I mean, whether you're looking at the IEA or the USGS, that's not necessarily the case.

MATT: Yes. What's interesting is that we've based all of this assumption on no data. [5:46]

JIM: That is amazing!

MATT: I mean, it would be like someone assuming General Electric could basically grow by 30% per annum, and that by 20 years from now they'd have a company that was bigger than the economy of the United States, because they needed to do that to support their stock price, and no one ever saying, "Wait a sec, how could a single company ever grow beyond the economy of the United States." But this is far more important in the unforeseen consequences: that we've effectively built a world economy on the illusion that Middle East oil would last forever at inexpensive cost. [6:22]

JIM: You know last year, Matt, the Saudi Oil Minister announced they could expand their oil reserves by 77% to 461 billion barrels. Is that a political statement, because their doesn't seem to be – from looking at your data in terms of how their reserves were compiled – where do they get that number?

MATT: They assume it! What's really astonishing is that I had a suspicion 2 years ago, when I'd finished going through 150 of these technical papers, that I might well have done an exercise no one in the world had ever done before, and that's piece together these individual study-area problems and put them together until you had basically done a forensic pathology of their oil system. And I wondered whether anyone in Saudi Arabia had ever actually done the same amount of research. And now it turns out, I was apparently the first person in the world to ever actually challenge the assumptions of the unlimited amount of their oil supplies. And it hit a nerve I would never ever have expected because I wasn't a household name – I think I am today in Saudi Arabia – I was just an investment banker in Houston. It was the same sort of reaction if someone went to the Vatican and said, "I hate to tell you all this, but there really isn't a God, and there isn't a Pope." And out of that came a massive public relations campaign by the senior management of Saudi Aramco, the state oil company, and the Petroleum Ministry that effectively has said, "we can produce 10 million or 12 million or 15 million barrels a day for 50 to 100 years. Our 260 billion barrels of proven reserves, there's this conservative number we can easily add another 200 billion, and we can still add another 200 billion we have yet to discover". And I actually think that they believe that, which is far more dangerous than "it's just a political statement." [8:18]

JIM: Now the thesis of your book is Saudi production is very near its peak...

MATT: I decided that this book was going to be so controversial that I really tried my darnedest to avoid a bunch of very specific conclusions that people could shoot holes in them: "how would you know that?" But I've had enough time now to reflect on everything I wrote about, and also feedback from lots of technical people that said, "you know what, what you triggered in the memory of what was going on in the 70s", and etc, etc. I think it's highly likely that they've actually exceeded sustainable peak production already. And I think at the current rates they are producing these old fields, each of the fields risks entering into a rapid production collapse.[9:03]

JIM: If this is indeed the case then, by assumption, we have to assume global peak is at hand then.

MATT: Absolutely. Once it's clear that Saudi Arabia cannot sustain increases in its production on a sustained basis, then in my opinion, with a certainty of 99.9% the world has actually passed sustainable peak production. Because one of the reasons all of these supply models always have Saudi Arabia producing 25 million bpd by 2025 is that there isn't another country on earth that has the potential to raise their production more than 1 or 2 million bpd at best. [9:41]

JIM: Why is it, do you think, there's only been 2 groups that have been concerned with this: you have the oil company executives, because they are obviously looking around the globe and they're not finding major elephants on a yearly basis; and then we've had environmentalists who have also been concerned about this. Those have been the main 2 groups, but aside from that, you have a third group, the economists, who basically just say, "as the prices of oil goes up the production goes up to meet it."

MATT: Yes, and they say it with a passion and a vengeance. What I've also found so interesting is that the concept of peak oil which is finally getting some serious traction as a discussion item gets scorned by economists – energy economists. What they hear is the world is running out of oil, they don't understand the concept of peak oil. And I continue to remind people that the difference between oil supply peaking and running out of oil is as profound as someone saying, "I'm getting a little bit hungry," and someone saying, "I have about 2 more minutes to live before I starve to death." And we will never run out of oil, in our lifetime, our children's lifetime, our grandchildren's lifetime. But by 2030 we could easily

have a world that can only produce 10 or 15 or 20 million barrels per day, and the shortfall from what we thought we were going to produce is only a modest 100 million barrels per day. So this is really a major, major, major global issue. [11:10]

JIM: It's not only a major issue, but if you look at Wall Street, the day you and I are speaking, oil is over \$62/barrel and the standard response is – in fact, one of the questions given to one of the analysts this morning is “when is it coming down?”...

MATT: “Why is it so high and when is it coming down?” [11:31]

JIM: You gave an analogy in terms of how cheap oil is at \$60/barrel, I wonder if you might share that with our listeners?

MATT: Sure. Because every time I get into a discussion now about the future of oil I always get asked, “well, where will oil prices be?” And my response is, “I don't have any idea where they're going to be, other than the fact I think on a secular move, we are still at a very, very cheap level of oil prices.” And that immediately gets a response, “Cheap?! Oil's at \$60 a barrel!” And one of the things I've observed is that people don't really understand what a barrel is. They can kind of conceive what a barrel might look like. But when you put it in terms people can understand, I say “what \$60 per barrel is, is 18 cents a pint.”

And then I get a response, “How did you do that?!”

“Well, you divide 60 by 42, to get a gallon of oil, and you divide a gallon by 8 to get a pint of oil, and that just happens to be 18 cents a pint.”

And then they say, “ Oh, that's really cheap, isn't it?”

And obviously it's cheap. I don't know what's the next cheapest liquid we actually sell in any bulk is, that has any value. I suspect there are places around the United States where municipal water costs more than 18 cents a pint. And yet for some reason, we created a society that was built on a belief that oil prices in a normal range were some place in the \$15-20 level. It turns out \$15/barrel, which is the average price of oil – in 2004 dollars – it sold for, for the last 140 years, is less than 4 cents a pint. So we've basically used up the vast majority of the world's high flow rate, high quality sweet oil at prices that were effectively so cheap, you basically couldn't sustain an industry. And now we're left with lots of oil. But it's heavy, gunky, dirty, sour, contaminated with various things oil, it doesn't come out of the ground very fast, is very energy intensive to get out of the ground and we're going to pay a fortune for it. [13:42]

JIM: Why don't you take us back, as we talk about this peak in oil in Saudi Arabia, to when oil was first discovered. Give us a little bit of background about Saudi Arabia, because up until 1930 there really wasn't an issue in Saudi Arabia. How did they emerge as a global energy power?

MATT: First of all, just a real quick history of oil because I think it's actually interesting to put into present context.

A year before the Civil War, Col. Drake effectively was the ‘Thomas Edison’ of discovering oil in Western Pennsylvania. But the oil fields there were tiny oil fields, and the stuff didn't come out of the ground very fast, but it was fabulously high quality. You know, Quaker State motor gasoline oil quality. So simple refining processes could make it usable. And over the course of the next 40 years oil was effectively a substitute for kerosene and coal gas as a way to create lamp oil. And then in 1901, we discovered the great Spindletop field in Beaumont, Texas, and that was the world's first giant oil field that could produce vast amounts of oil; and after that and a few years later we discovered the Golden Alley in Mexico; we discovered oil in Iran. And by 1930 we had a concept – we had just discovered the great oil field in Kirkuk, in Iraq, ironically about 2700 yards from the burning oil fires that were mentioned in the Bible, in the time of Nebuchadnezzar – and in 1934 Abdul Azziz, who had just finally consolidated the kingdom that became known in 32 as Saudi Arabia, who's the father of King Fahd who was buried yesterday, granted a concession to Standard Oil Company of California to begin looking for oil in Saudi Arabia. And in 1938, when the world economy was so fragile that we were still closing banks, they were just about to shut down their efforts after a very disappointing series of dry holes, when they hit discovery of Prosperity Well #7, and ushered in the oil kingdom of Saudi Arabia. By 1970, Saudi Arabia was producing 3 million bpd; by 1974 they were producing 8 million bpd; by 1980 – because of Iran collapsing and then the Iran-Iraq war – they hit their peak at 10 ½ million bpd and by then they were terrified they were producing oil at rates that couldn't be sustained, and were going to destroy these great fields, because it was coming from 4-5 fields. And yesterday was not just the day we buried King Fahd. Yesterday was also, ironically, the 15th anniversary of when Saddam Hussein invaded Kuwait. Did you all remember that? [16:38]

JIM: Sure do.

MATT: And it was that event that actually started to profoundly change the world, because within a week of that invasion – and the Republican Guard poised on the Saudi Arabian border to hit the South and to do the same thing to Saudi Arabia they'd just done to Kuwait – President Bush and his chief advisors decided to embargo Iraq and Kuwait, and they convinced King Fahd to station troops in Saudi Arabia to prevent the Republican Guard from taking over Saudi Arabia. Because had that happened, by the end of August, 15 years ago, Saddam Hussein would have controlled 15 million barrels of oil per day and would have been the emperor of the world. So this was really a profound series of changes. And then everyone in the world had to ramp their oil supplies up. And Saudi Arabia took great pride, as they saw, in 90 days, they could go from five back to eight million bpd, and stabilize the world oil markets to keep oil prices from going to \$100.

And out of that decision came an accidental move back into a concept that they had no rate-sensitive production, and that is when all of the water problems that were starting to worry them so profoundly in the 70s started coming back. And they've effectively spent the last 15 years trying to fight these problems, and figure out how to get out of this box, while they were pretending to each other that their oil fields had no rate-sensitivity of how they were being produced, and what they did for 70 years they could do for another 70 years. So I thought the irony of burying the King yesterday, on the 15th anniversary of Saddam's move into Kuwait happening at the same time, was really unbelievable. [18:17]

JIM: As we take a look at some of the facts as we know them today, the Arabian Peninsula – as you pointed out in your book – has been very heavily explored, contrary to opinions otherwise.

MATT: Using the very best technology known to man. [18:32]

JIM: We've got 5 fields that are super giants that account for 90% of the oil. Of these fields, many of them have been in production 50 years or more, and there's been very few fields discovered since 1980 that produce more than 250-300,000 bpd.

MATT: In fact, the record actually is, that in 1967 they discovered the last great field that has ever been discovered in Saudi Arabia. And the only field of any significance since then, has been in 1989 the Hawtah field – the Hawtah field and 5 satellite fields – peaked at 200,000 bpd. Now, some of the people that are skeptical of my views say, "how could you say 200,000 bpd isn't a great oil field?" Well, 200,000 bpd in Saudi Arabia, as the best you've done in 35 years, is a very scary number.[19:23]

JIM: Why don't you give us a bit of a history, because I don't think most people realize we may be driving around here in Southern California with a gallon of gasoline in our tank that came from one of these fields.

MATT: Of the 10-11 million bpd that we import into the United States, 1.5 of that is Saudi Arabian oil, so statistically there is probably a pretty good likelihood that 1 out of 10 motorists in California have Saudi Arabian oil in their tank. [19:52]

JIM: Matt, give us a bit of a history, because most people know oil wells don't last forever, but some of these in Saudi Arabia have been around for 50 years. I like the analogy that you use of the chess board and I wonder if we might start with that analogy, as we get to the Saudi fields.

MATT: Yes. The French Petroleum Institute did a major study a couple of decades ago, about the distribution of oil fields by basin. And what they found was that what seems to happen with phenomenal regularity is that within about 5-7 years of moving into a new area of prospective hydrocarbon, you tend to find the queen first, which is the second largest field you're going to find; you then calibrate in on the knowledge of how you found that and within a handful of years you find the king; and then over the next decade, you find there too, the next 8-10 lords. And once you've found the royal family, the rest of everything you'll ever find are basically peons in size.

And if you then say, "how did that work in Saudi Arabia?" In 1940 they basically found Abqaiq which was the best, in reservoir quality and quality of oil, field they've ever found, and Abqaiq peaked at about 1.2 million bpd in 1972. And then they had a hiatus during World War II when they really weren't exploring. So had they not had a hiatus, they would probably have fast-forwarded this 4 years. In 1948 they discovered Ghawar which is the world's largest oil field. In 1951, Ghawar came on production. In 1951 they discovered Safaniya which is basically the largest offshore oil field ever, and in terms of output was bigger than Abqaiq, but basically 40% of Ghawar. And then over the course of the next 15 years they found the rest of the royal family. And from 1967-2005 they've actually found an accumulation of little deposits they've never produced, even though they were always worried about too little diversification of supply. But for some reason or other they just couldn't produce these fields. Now they're going back and trying to rehabilitate a bunch of fields that were crummy fields in the 60s and 70s, that couldn't ever sustain much production, and they're claiming these fields can easily get up to 500,000 bpd and last 30-50 years. There is no technical support that that can be possible. You can't say it's

impossible, but the fact that these fields couldn't produce in the 70s gives rise to real caution that basically they're deluding themselves that through the use of modern oil field technology they will be able to do something no one in the world has been able to do. [22:42]

JIM: In the history of Saudi oil exploration there's certainly been a great effort, they've used great technologies – state-of-the-art technologies – but simply the oil hasn't been there to the extent they were discovering it in the 40s, 50s and maybe early 60s.

MATT: All the great fields, ironically too, were discovered by eyesight, as opposed to seismic.[23:04]

JIM: Now, if we take a look at Saudi oil production at 3 million at the time that US oil production peaked in 1971 – you know, Matt, as I look at energy over the centuries we've been very lucky as a human race: we've had wood as a source of energy; that was replaced by coal; then we had oil that replaced coal and gave us our industrial society – but more importantly, as US oil production peaked in 1971 Saudi Arabian oil production was able to take off and take our place. There's nothing out there!

MATT: With fabulous ease too. Also ironically in the last 3 years of the 1960s, we discovered the last 3 great provinces of brand new oil when we found oil in Alaska in 1967,68; we found oil in Siberia about the same period of time; and we found oil in the North Sea in 1969. And Siberian, Alaskan, and North Sea oil, effectively combined to produce: the North Sea peaked in 1999 at a little over 6 million bpd, it's already down 25%; Alaskan oil peaked in the 1990s at 2 million bpd it's now at about 900,000 bpd; Siberian oil peaked at about 9 million bpd and it's about 5 million bpd. And we haven't basically found another province since the late 60s. [24:31]

JIM: How are we able to keep production up, because if you take a look at the increase in demand now coming from emerging countries such as China and India, oil production has increased for decades? How are we able to do that with many of these fields going into decline?

MATT: Well, we continue to pull more and more out of the North Sea, and then we found deep water which was a fabulous last shot from the basins we already had shallow water production. And we took the Middle East oil back up to unsustainably high levels of production. So probably, we're sweeping the cupboard bare. People looked at the way we were able to do this and thought, "wow! this is actually easy," without realizing what we were actually doing was totally non-sustainable. [25:23]

JIM: If I was to use the analogy to advances in technology, were we just using bigger straws in effect to get the oil out?

MATT: Absolutely. But so many oil experts got giddy, by seeing the return to high flow rates, they started believing that we were actually now finally getting a vastly higher amount more oil out of these fields than we could produce before, and therefore we were headed to an era of unbelievably plentiful oil, at unbelievably low prices. And I'll tell you, as we speak right now, ironically the same week that *Twilight in the Desert* began shipping, Cambridge Energy Research Associates, Daniel Yergin, who, I think, a lot of people think is one of the more respected – or maybe most respected – oil analysts on Earth, began producing a report saying effectively – and there was a big editorial piece in the Washington Post this Sunday – that the world, between now and 2010 – which is not very long away – is going to add 16.4 million bpd more oil, and create a massive oil glut, and collapse the price again. Now, I've read carefully through Daniel Yergin's detailed field-by-field bottom-up report, and basically, it is a really flawed piece of analysis in my opinion. But the fact that they obviously believe it's correct – they're doing talk shows – shows you the depth of limitation of people that really understand how serious this is. Cambridge Energy Research Associates also, in 2001, were unbelievably poo-hooing the idea that the United States had now entered a major natural gas crisis. But by 2004 they got the religion. I expect by 2009 they'll issue a magnificent tome saying, "gosh! it looks like the world is now past sustainable peak oil supply."

But what's dangerous is how many of the optimists really believe we won't ever have any oil problems. I hope I'm actually wrong in my dire predictions, but I hope people actually take them seriously and figure out a way to prepare for them, since if we do that we win either way. [27:24]

JIM: Let's talk about this, especially the downside of Saudi oil production which is increased to meet some of the demands in this new century. How is it achieved, and then, I'd like you to address the dangers of over production in terms of what they're doing today?

MATT: What Saudi Aramco effectively pioneered in the 60s was a method of injecting water into the flanks of these highly pressurized reservoirs, so that every time you produced a barrel of water you injected a barrel plus. So you never had reservoir pressure declines. And what they were effectively doing, if you could visualize this on a sort of 3D screen, is

that the injected water was basically a giant battering ram, squeezing the oil column up higher and higher, preventing the reservoir pressure from ebbing, and also secondarily, sweeping the oil from the flanks of the field to the center. So the water was basically creating the drive to get the oil out, at very high flow rates, without having to resort to artificial lift. And over the years the amount of water injection has risen to where today – this is again one of those numbers that's a state secret but you can backend to the fact where, now – to get 8-9 million bpd out of the ground, they're injecting somewhere between 14 and 18 million barrels of highly saline water into the oil fields to maintain that rate.

Once the sweep is finished, and they get all of the easily recoverable oil out, the reservoir pressures will collapse just like clockwork – you just don't know when they're going to collapse – and once oil pressures collapse, the production of fluids might stay the same, but the vast amounts of fluid will be water as opposed to oil. And then they'll go into the era of the relentless challenge of pulling oil that is still there out of the ground through artificial lift, just like the United States had to do once we peaked. And the majority of what they will be lifting out of the well bores will be water, not oil. And that statement is just as basic as a doctor saying, "you know, these 70 year old people, twenty years from now, will be a lot older, and most of them will be way, way slower in their physical movements and the quality of life will have diminished, and the cost of life will have risen, but we'll still have them alive." [29:58]

JIM: Talking about the dangers of over production, there was this Senate hearing in 1974 with various Aramco executives, later Seymour Hirsch at the Washington Times talked about the significance of this. I wonder if you might explain the smoking gun?

MATT: It is a really interesting footnote of history, that almost nobody knows anything about. And I actually had a little bit of understanding, and the book was already at John Wiley & Sons as a finished manuscript, when I finally got the reference points to go back and find that these Senate hearings, and all that's been in papers, has been residing in the Library of Congress for the last 35 years.

What happened was right at the height of the 73 oil crisis, in early January 74 – when we had gas lines, people were just panicked – Jack Anderson, one of the leading muckrakers of the day published in the Washington Post three back to back articles, saying that he was in possession of secret papers from someone within the Aramco companies, that they had made the conscious decision to convince Saudi Arabia that the fields could be produced at any rate, so that they could get every saleable drop of oil out; and at the rates they were now producing, they had such massive problems that they were going to have to throttle back their oil, and the embargo let them off the hook.

And the Washington Post articles caused enough of a sensation in Washington that the Senate Committee on Foreign Relations, who had a subcommittee they had just recently created, called the Subcommittee on Multinational Corporations and Their Influence on US Foreign Policy, decided to ask Jack Anderson to come in on closed hearings and describe what this was all about. So, on January 28th 1974, the hearings commenced and Jack Anderson asked to be sworn in, and then he begins his hearings by saying, "I want to tell you all that I asked to be sworn in so that everything I tell you is under oath, because Aramco is already saying I am just making this stuff up." He tells the stunning story about the whistleblowers who have given these papers because they think the Aramco companies are now operating against the best interests of the United States of America. And because he won't disclose who his sources are - *déjà vu* the sort of current reporters' confidentiality - they decide to go ahead – they being five key senators: Frank Church, Ed Muskie, Stuart Symington, Chuck Percy, and Clifford Case – and subpoena all four of the Aramco companies – this is Exxon, Chevron, Texaco, and Mobil – and out of that come a sheaf of papers and memos, that if you know how to properly analyze this stuff effectively said this was a true story. But because the hearings go on – there are 4 hearings, the last hearings on June 20th, where they have 7 or 8 of the senior executives of the oil companies come in. And only one guy, Bill Messick [*phon.*] who's the chief reservoir engineer at Chevron, who under oath says: "absolutely we were over producing these fields. We could never have sustained these rates. And yes, we were damaging the reservoirs."

The rest all disagree with him, "No, there weren't any problems. No, this is unbelievable. No, we didn't worry about getting nationalized."

And what's amazing when you read through the memos these people were sending to each other, they either didn't understand what they were writing, or they were fibbing to the United States Senate. Then, in 1979, an event happened. And this is where it gets into more hearsay, because of the fact that the only documentation out of the 1979 subpoenas is a very odd staff report from the same Senate subcommittee, that's 33 pages long, that effectively documents that Aramco has just lowered their production targets from what used to be 20-25 million bpd, then it was 16 million bpd, then it was 12 million bpd, because they've lopped off 70 billion barrels of proven reserves as unrealistic. They said, "if we produce 9.8 million bpd for the next decade and a half, in the early 90s, North Ghawar, Abqaiq and Berri, the finest oil Saudi Arabia has ever produced, it's 75% of the oil production, will go into irreversible decline." And what's interesting is that this 33 page staff report is very garbled. You have to really almost take notes and piece this stuff together. The subpoenaed papers they got from these were basically, for some reason or other, deemed to be so sensitive they were put under lock

and seal for a 50 year period of time. And there was a debate about what material to disclose, and so they decided to produce this staff report and dummy it down. Had that gotten the attention it deserved, the world would have known 30 years ago, or 35 years ago, that the Middle East didn't have unlimited amounts of oil, and we would have had a totally different long term energy plan in place today. And instead, we operated for the next three decades under the illusion that was intentionally created in the early 70s, that the Saudi Arabian oil fields would last forever.[35:16]

JIM: Speaking of that period of time, you have a different take on the oil crisis in 1974. You believe that the brief oil embargo was not the problem. It was the lack of spare oil capacity while demand was a runaway freight train between, let's say, 69 and 78, where we went from demand of 45 million bpd to 65 million bpd – that's a 44% increase.

MATT: Yes. We ran out of capacity, and when we started creating shortages then motorists in particular hoarded, and that creates a run on the bank – and if you ever have a run on the bank, banks can't keep money or cash on hand to equal the deposits they hold – and so the shortages begat more shortages, and that's what created the 73 crisis and the 79 crisis. [36:09]

JIM: Isn't that where we are, in effect, today. Demand has gone up once again, it has increased, even since the beginning of the new century. There aren't any notable new sources of supply.

MATT: Let me give you some really interesting *déjà vu* numbers that I pulled out earlier this morning while I was thinking about the irony of the 15th anniversary of Kuwait's invasion by Iraq. I had just produced a paper called the *Coming Domestic Oil Embargo* – and it got enough notoriety that Forbes magazine was in preparation for doing a major article that came out a week after Saddam's invasion, called the *Coming Domestic Oil Embargo*, and they had a fabulous illustration of Uncle Sam filling up his car at a gas station and accidentally stepping on the hose – and what the story was all about was my concern that unless we started a totally different energy policy of using less energy, or a policy of expanding our oil supply through removing the drilling bans in the inner Continental Shelf, and finding a way to jumpstart creating more drilling rigs, and bringing more people back in, we'd wake up some day – and I never thought it would be that day, or anytime in the 90s, but I knew it would take 10 years to make this happen – we would find we had actually embargoed ourselves.

Let me tell you what the numbers were all about, because I had not thought about this until yesterday and today. In 1990 the United States was still producing 7.3 million bpd of crude oil, today it's 5.1; the 7.3 was after a drop over the previous 5 years of 1.6 million bpd; our refineries only needed to run at 13 ½ million bpd; and we only needed to import 5.8 million bpd of crude oil imports to balance our system. Today we have to run our refineries at 100% or we have major product shocks; today, we have to import 10-11 million bpd, or we lose crude oil stocks; we have to basically create almost 3 million bpd of finished product imports; we have to run the system on a 24-7, all Summer long. And we still liquidate stocks.

So we have actually now created a pending domestic embargo, and we're going to be lucky to get through the Summer without some periodic shortages. We probably will, but the odds are probably as high we will have some shortages, and then if we get through the Summer we have a fabulous respite from Labor Day to Thanksgiving, until we hunker to try to figure out how the world gets through the Winter of 2005 and 2006 because oil demand globally could easily go to 86-88 million bpd during the Winter, and that could easily exceed supply by 2-5 million bpd.[38:53]

JIM: If that was to happen we would almost be looking at \$75-80 oil, I suspect.

MATT: No, no, no. Oil prices could easily go up 5-10 times.

JIM: Wow! Matt, let's take people on a sort of trip to the past, and I want you to explain Aramco. What was Aramco, how did it start? And then from Aramco becoming the Saudi Aramco, explain how reserves increased substantially without oil discoveries, and they remained there the same.

MATT: First of all, Aramco used to be called Casco, when it was 100% owned by Chevron, and then they brought in Texaco as a partner, and that's actually when they changed the name to the Arabian American Oil Company – Aramco – and Texaco came in as a partner as more of a marketing arm, to help them get rid of this Saudi Arabian oil because Saudi Arabia didn't need any oil. And then after World War II they invited Exxon and Mobil to come in as partners. And so those were the four owners of Aramco, with Saudi Arabia being the host government getting production sharing payments – sort of rents – for this oil. Then in the early 70s the Saudi Arabians took over 25% ownership, even though everyone said, "No, they'll never take us over." But by the end of 1979 they had bought out the four owners. And that's when they kept the name Aramco until, I think, 1988-89. But from 1980 on, Aramco was basically run by the Saudi Arabian petroleum ministry.

In 1979, when these Senate hearings were being held and under subpoena, what the last year Aramco was being managed by the best technicians within Exxon, Texaco, Mobil, they told the Senate investigators that under proven reserve methodologies required by the SEC, Saudi Arabia had 110 billion barrels of proven reserves, but interestingly enough they said 61% of those, say 65 billion barrels, were coming from the 4 fields that created 87% of the production. And the other 39% were the other 13% of production, which raises in my mind how valid the 110 even was. Probably overstated. They said that if you add proven and probable together you get to 177 billion barrels. And if you take proven, probable and possible you get till 246 billion barrels.

By 1987 those same fields' proven reserves had escalated to 260 billion barrels and they've stayed there ever since, and they found only one other significant field. Now, what I found amazing is, there are quite a few people that basically tell me with some conviction that they really believe the 260 billion barrels is a real number – conservative – and they real believe somehow or other, regardless of how much oil Saudi Arabia has produced over that period of time, they've found a way to just continue to add because these fields are so big. I happen to think there is very, very good, solid evidence, to say that the guys doing reserve estimation in 1979 were far more knowledgeable about how the art-form is needed to do that analysis, than the new generation of computer jocks who just enter assumptions into a computer and the computer does the thinking for them. So, I would suspect that the real, easily recoverable high quality proven reserves were probably about 70 billion barrels in 1979, and that they've now produced 55 billion of those, which gives rise to one more triangulation of the fact that we should be prepared for, and not totally surprised when the five key fields of Saudi Arabia go into irreversible collapse. And they could fall over a 30 month period of time by 50-70%. Hopefully, that's a draconian estimate but the fact that that has at least a 35-40% probability shows you how unbelievably dangerous it became to have no data and such strong beliefs. [43:09]

JIM: One of the things that struck me about reading your book is once the Saudi government took over Aramco they immediately increased the reserves, without any oil discovery to back that. And then in 1988 – I believe this was all done politically – there was another significant increase in reserves so...

MATT: They jumped from 110 to 160, from 1979-1980, and then at the end of 87, starting with the number they reported in 88, the 160 became 260. They were called paper barrels at the time. [43:42]

JIM: And wasn't that the case with a lot of OPEC countries, that all of a sudden, overnight, everybody increased their reserves.

MATT: They all got into arguing that they should have production quotas based on the number of proven reserves. And so Kuwait, and Iraq, and the UAE went from 30 billion each to 90 billion, and actually, to give Saudi Arabia credit, they were the last to fall in line of the Middle East producers and also triple their reserves. But why anyone ever believed it is what I find so amazing. Any time you see a static number for twenty years, people should obviously start saying, "that obviously isn't a real number." [44:20]

JIM: This is surprising too, because what does OPEC produce, anywhere from 22 million to what, 27 or 28 million?

MATT: If you include all of OPEC today they basically produce somewhere between 27 and 31. And the fact that we don't actually know that is scary.

JIM: And yet they're producing 27-31 million bpd...

MATT: Of the world's 85.

JIM: And there reserves never go down. And nobody questions it?

MATT: And knowledgeable people! I was on Canadian broadcasting Corporation's morning radio program yesterday and they quoted a friend of mine that they'd interviewed the day before, Professor Michael Economides of the University of Houston, and Michael said something to the tune of, "I have a high degree of admiration for Matt, but he is totally wrong on his views of Saudi Arabian oil. I've done the numbers and the 260 billion barrels is very conservative, and they can easily add another 200 billion barrels, and adding 5 or 6 million bpd for the next 50 years is very easy for them." And I thought to myself, "How does a person actually say, 'I've done the numbers', when there are no numbers to do." But he obviously believes them, otherwise he wouldn't have been quoted on Canadian Broadcasting Corporation. He's written a book called the *Color of Oil*, and he was a Schlumberger technician before he became a Professor at Texas A&M, and then U of H. So you know he's not a shoeshine guy or a novice, he obviously believes that it's a conservative number. I don't have any idea how he comes up with that concept. [45:50]

JIM: Well, the same is true, is it not, of Daniel Yergin, where they came up with the same kind of story?

MATT: The presumption I have is, if you actually ask them the pregnant question, “tell me, within your top 5 clients, does Saudi Aramco happen to be one of them. I think you’d have both of them, if they were telling the truth, say ‘Oh, yes’.” [46:08]

JIM: Now in your view and study of these oil fields, you believe – and we need to emphasize again that many of these fields have been around 45,50 years producing oil – that a lot of these major fields are close to tipping points.

MATT: Yes. And I also believe that – Ghawar, for instance, which is really the whole 9 yards, because that is 60% of their production – that North Ghawar, which is the top 20% of the field, has a productivity index that is about 25 times the productivity index of the rest of Ghawar, and that’s the area that is almost depleted now. And when that drops, you could basically see Ghawar go from 5 million down to 2 million bpd in a very short period of time. [46:55]

JIM: So, based on your study – and in fact you state this in your book – you believe there is no way that Saudi Arabia is going to be able to produce 20-25 million barrels.

MATT: No, that’s impossible. What’s interesting is that now there are a number of people within Saudi Arabia that are starting to say publicly, “No, that’s impossible.” Dr. Sadad Al-Husseini who was eased out of being Executive Vice-President of Saudi Aramco a year ago February, because I’m told, he was actually starting to scold people for being naive about how much they could produce, has been on record in several different places as saying that Saudi Arabia could never produce over 12 million bpd. It is just not in the cards. And he was known by everyone who counted as the brains of Saudi Aramco. So we should be listening carefully, and I’m going to be very curious to see in the new regime change whether there’s some jobs that start to change, because I have a sneaking suspicion that my book is going to educate some people in Saudi Arabia to what the real issues were. And maybe some heads were going to roll – not literally – of people that have been promoting this concept of ‘don’t worry about our oil’. And we’re going to go back to a return to the conservationists within Saudi Arabia, and see them lower their rates of production, so they can sustain it for a longer period of time. And if that happens, I think I’ve done Saudi Arabia a great favor because I’ve given them grounds to do that, without the world thinking, “these crazy people in the Middle East are trying to blackmail us.” [48:30]

JIM: Let me throw something that typically comes out – and maybe this is just a natural phenomenon being an American – is our great belief in technology, Matt, and anytime you talk about oil shortages, or higher oil prices, the technology factor comes to the forefront and, “Hey, we’ve got all this great technology, we have better technology today than we had a decade ago and this technology is going to save us.” But you don’t believe that’s the case.

MATT: I know it’s not the case. The one thing our firm is really good at is understanding the oil services industry, that’s the one part of the oil energy investment business we’ve really had a dominant investment banking position. During the 80s, when the industry was under such duress and struggling to survive, we got involved in so many of the rescue projects of these companies, that it really effectively ended up saving the day for horizontal drilling, multilateral well completion, 3D seismic, subsea completion systems, and I know that stuff inside out, as to what it really actually does, because we had to, to get our jobs done. I watched with utter amazement in the decade of the 90s, one oil company after another, starting to go to conferences and say, “the rig of today is like 8 rigs of the past, because it’s new technology. 3D seismic has eliminated the need to drill dry holes. We are now recovering twice as much oil as we used to get out.” These guys are hallucinating. They have no idea what they’re talking about. In 1995-96, I started talking about giving speeches in Aberdeen and Stavanger at the North Sea Oil Show saying, the North Sea is just about to peak and go into irreversible decline and I get these astonished looks by senior executives of the major oil companies saying, “Matt, you don’t understand technology.” Well, it turned out that I didn’t ever say 1999, I said in the next two or three years. 1999 was the high water mark for the North Sea, and it is already down 25%. So it turned out everybody that started using these tools got mesmerized by the high flow rates that got created at the well head, and thinking that they had discovered the fountain of youth. And that’s just what’s going on inside of Saudi Arabia today. They are going through the same hallucinatory process that all our major oil companies did 5 years ago. [50:46]

JIM: Based on reading your book, and the extensive studies – as you said many of these major oil wells are now at tipping points – we’re likely to wake up one day and find out that oil is over \$100/barrel, we can’t meet...

Matt: It’s still cheap at \$100!

JIM: Yeah, at \$120 it’s 36 cents a pint, which is still cheap.

MATT: What the economists ought to be trying to figure out is: what constitutes a fair price for oil versus their belief that oil prices are really expensive today. I would argue that probably a number in the \$5-10/gallon is a real bargain. [51:24]

JIM: Matt, what comes afterwards? One day, as I mentioned, we're going to wake up and find out that peak oil is here, we're going to be dealing with it. Do we go to oil rationing? Do we go to a major, national conservation program? And I guess even more importantly than that, given the high demand on oil today – not only just from the United States and Europe, but India and China – how do we ration oil without going to war?

MATT: We have to figure out a way to do that because if we go to war, it will actually be the worst war we've ever fought. And if we don't address the problem, we will be in an energy war. What I find interesting is I actually think we can solve this problem, but I also think if we ignore it, you can't create a scenario that is too awful. What we have to do is first of all, long term, create some new forms of energy that don't exist today. That might or might not be possible. I suspect that actually it will be possible because we haven't worked on it for a hundred years. While we're doing that though, we have to figure out a way that allows the world to prosper and not shrivel up while we're using a lot less oil per capita. And figure this out quickly enough so we educate the China and India's of the world on how to create a sustainable society so they don't build a society like ours. Because it's going to be easier for them to do some of these things than it is for us.

And I'll give you just a quick shopping-list of some of the things that we are actually going to need to do. In the shipment of goods, we use worldwide about as much, or a little bit more, diesel fuel than we do motor gasoline, and most of the diesel fuel is used by the truck fleets moving goods. If you could wave a magic wand and in a 5 year period of time and get all of the goods off the highway system going long distances by trucks, and put them on either railbeds or water transportation: on the railbeds – railroads – as long as you have long distance transportation, and long trains versus short trains, and short distances, you can get an energy efficiency savings of somewhere between 3 and 10 times – that's not 3 and 10%, that's 3 and 10 times; if you can get them on boats versus trains, it has an additional energy efficiency savings of another 2 to 5 times. So by getting trucks off our highway system we have a major impact on removing traffic congestion. And traffic congestion is public enemy number 1 through 5 on passenger car fuel efficiency. So it's a real win, win, win.

At the same time we have to alter our distribution of food. You know, the average thing we eat today comes from, I believe, an average of 1500-2000 miles. But there are a lot of items, like the first time I ever heard of this concept of food miles was a speaker in London, last Spring, who pointed out that in the Summer in the UK, almost all the apples come from New Zealand, and they have embedded in them 22,000 miles of travel of a vessel, half coming from New Zealand, and the others going back. When they're onboard the vessel they're refrigerated. So it's a very energy intensive process. We actually can grow stuff close to home in most parts of the world. We just got lazy and thought it was really fun to just go into a grocery store and see all this produce: it doesn't taste very good, but it looks nice.

And then finally we can basically go to distributed work. Because I found being in Maine in the Summer is a lot more pleasant than being in Houston, I taught myself 10 years ago how to be up here and be more efficient than when I'm in Houston. I think there are lots of corporations that have a thousand people working together; there's no need for a thousand people to be working together, other than the fact it was just a historical coincidence. We now have the technology that people can actually either work at home or work in their village, and by saving 2-4 hours of commuting they will be far more productive. And then we basically end globalization as we know it today, which is effectively a really flawed plan of breaking manufacturing components down into their smallest parts, and finding the cheapest place in the world to manufacture the parts, and then zinging them around the world to be assembled into bigger, and bigger units, until they finally arrive on the showroom as a piece. If you make stuff close to home, you can have a major savings in fuel efficiency. That sort of a plan put in place over 5-7 years would take a lot of coordination; not a single one of those things are impossible to do. We could literally end up cutting oil consumption by 20-40%, by doing all of those. [56:04]

JIM: You know, the only problem with that, Matt, as we speak right now, with \$62 oil, we have, as you say in your book, no plan B.

MATT: Nope. While we're doing Plan B by the way, we jumpstart the largest energy R&D program ever envisioned, and just pray that over 5-7 years it has the same impact as when people got serious about developing radar, and developing nuclear power, so that we could actually win World War II. But if we don't do these things, then this really ends up being a very dark world – no pun intended. [56:40]

JIM: The problem is, even as you and I are speaking today, we still have, you know, Economides saying there is plenty of oil that Saudi Arabia can produce...

MATT: Yup, Dan Yergin says we are going to have an oil flood. But you know what, I really love the study of history, I think you can learn so much about history, and on August 3rd 1939, we were down to 28 days left before we officially

entered World War II. Basically, Hitler had conquered a whole bunch of places, and yet there was still one loud voice in the world, Winston Churchill, saying, "this is madness!" 99% of the other people that observed were basically saying, "You know, I'm so glad we never ever going to have a war again because war is so awful that we should just never have another war again." And we got a rude awakening on September 1st 1939, that in fact we were at war. And in a 6 year period of time – 5 ½ year period of time – England, Canada, the United States, Australia and New Zealand built a war machine that was so powerful we destroyed Europe and Japan. And I think if we take this as seriously, when we have a wake-up call, that we can actually end up with not having to basically destroy the world as we know it today before we rebuild it, but doing it before it gets destroyed. [58:02]

JIM: What is it going to take to get us to that point? Is it \$100 oil, gas lines...

MATT: A shortage. I hate to say it, but I just think if we are where we are today – where things are so unbelievably crystal clear for me – there was a program in Washington, DC where 5 of us spoke at the Hart Senate Office Building for 2 ½ hours, from 2:30 to 5:00 in the afternoon on peak oil. And of the 5 of us, I was the only one who didn't have a Phd. And the first one who spoke was Roscoe Bartlett from Maryland, who has his Phd in science, became a Congressman when he was 66 years old, has 40 or 50 patents to his name, and he gave the most impassioned speech I ever heard anyone give on peak oil being the biggest risk the world has ever faced. And you know, this conversation should have happened a decade ago, but thank heavens it's happening today. But I also think we're going to have to have a shortage before we realize that this was effectively Poland being invaded by Hitler. [59:05]

JIM: Matt, what has been the response to your book – not only in Congress, but also let's say in the White House – because it's going to take leadership from the top down to get this country moving in that direction?

MATT: First of all, I don't know and I haven't tried to call people and say, "How did you like the book!" I know from being in Washington twice last week, a lot of people in government are in the middle of reading the book. It's not a hard book to read, but it's not a book you sit down in the evening and say I'm going to do this from cover to cover. And so my guess is – what I was told yesterday by the publishing firm, they just did their July wrapup, they are now in their third printing, it has sold 44,500 copies, which is a really tremendous amount of books in their experience for a book that has not had really a ton of publicity yet – I think it will be Labor Day before I start getting really good, widespread feedback. But from the letters and emails I've had so far, which range in the hundreds, I'd say 1 out of 20 people are raising questions or suggesting I should've done something different, and about the other 19 are saying the nicest compliments I could ever imagine. I would've actually thought, getting closer and closer to the publication date, that by about 6 or 8 eight weeks into it, somebody would have launched an attack of some argument I would never have thought of, to really try to discredit the effort. But so far the arguments have been a handful of people who work for Aramco as clients, and all saying the same thing, "technical papers are a stupid way to do analysis because they just deal with problems; investment bankers don't know how to read technical papers; and they've technically proven they don't have any problems by their 'trust me' statements." [1:00:53]

JIM: Matt, if you were to talk to a reader of your book, and have that reader walk away with one important concept, what would that be?

MATT: That we've probably exceeded sustainable peak oil, and read the book and you'll see why. When I finally realized I had about one more day to make any last changes in the book and then it was going to go print, I read through one more time and I thought, "you know, I actually sort of feel like I now have just submitted the briefing papers to the Supreme Court, as a lawyer for some really important issue. And I think I've actually said it the best I can. And now we're going to basically see what world opinion and how they digest this stuff." [1:01:33]

JIM: Perhaps a final question. Having read your book what is it that we can do as individuals right now.

MATT: We can all clamor for energy data reform. That's the one thing that can happen before the end of this year, and where are mandated field by field quarterly production reports, and the number of well bores each of those fields have; some data on proven reserves we don't even need. That's the only thing we can do and effect in 2005, and that system being mandated would allow less than 30 people in less than 30 days to come up with a realistic supply assessment over the next 3 years, and pretty well prove or disprove we've actually now exceeded peak oil, or it's right ahead of us. That's the one thing that every person in the world has a role in demanding that happen. And if people say, "Naw, that's not important," we fully deserve every bit of pain we're going to get. [1:02:29]

JIM: When you look forward into the future, 5 years out, 10 years out, are you optimistic or pessimistic?

MATT: Yes, I am. I am optimistic that we're going to figure this out, and we're going to go to plan B and plan C and that 7-10 years from now we're going to say, "look at all the fundamental changes we've made." And we'll have a better economy, and we'll have resolved all these nasty, nasty fights between modern energy producers, and people that have called themselves environmentalists. And actually have a better quality of life. And we'll be paying very high prices for energy which we should have been doing for the last 100 years. [1:03:00]

JIM: Well, I'll tell you, it's a very thought-provoking book, and I think it is a book that is very timely, especially now for anyone listening to this program, just turn on your TV or pull into a gas station and take a look at the price of oil.

MATT: And remember: 18 cents a pint. [1:03:17]

JIM: Yes, 18 cents a pint, but it's gotten people's attention.

Matt, I want to thank you for joining us here on the Financial Sense Newshour and giving up part of your vacation time. One of the best books I've read on energy, and I've read a lot of them, and I think very timely. I commend you on the work you've done and I think you've done us all a great service.

MATT: Thank you very much. I appreciate being on the program.