CARNEGIE COUNCIL *for Ethics in International Affairs*

The Frackers: The Outrageous Inside Story of the New Billionaire Wildcatters

Public Affairs

Gregory Zuckerman, **Joanne J. Myers**

Transcript
Introduction

JOANNE MYERS: Good morning. I'm Joanne Myers, director of Public Affairs programs, and on behalf of the Carnegie Council, I would like to thank you all for joining us.

Our speaker today is the best-selling author and *Wall Street Journal* reporter Gregory Zuckerman. Greg is here to discuss his new book, which is entitled *The Frackers: The Outrageous Inside Story of the New Billionaire Wildcatters*. In it, he tells the dramatic story of how a few brash, ambitious, and determined men transformed our country's energy reserves, upended global geopolitics, and raised major concerns about the environment.

From all accounts, hydraulic fracking, or fracking, as it is simply known, is said to be the most significant energy discovery of our time. It has also become one of the most hotly contested topics for both the positive effect it has had on our economy in creating new jobs and also for raising concerns because of the negative impact it has had on the environment.

Fracking, for those who are not quite familiar with the term, is simply defined as a process whereby drillers blast millions of gallons of water, sand, and chemicals at high pressure into deep layers of shale rock to extract natural gas and oil. This technique has proven so effective at reaching previously hard-to-access reserves that it has spurred a boom in natural gas production around the country.

Geologists have long known that these energy reserves existed. Even so, it wasn't until just recently that men operating at the fringes of the oil industry sought to take advantage of technological innovation to open up shale oil and gas reserves that previously were not financially viable. While fracking has certainly given a boost to an ailing economy and reduced our oil dependency, opponents worry that this technique is polluting groundwater and the air we breathe. They question whether some are too interested in the short-term gains without being aware of long-term risks. They posit that we may be better off if, instead, we move more quickly toward developing clean, renewable energy sources.

While there is little doubt that natural gas extraction can negatively impact the environment, it is also argued that the process is manageable with industry best practices and strong independent regulation.

Through the ages, experience has shown that new technology always contains some element of risk

and uncertainty as to future consequences. The challenge is in finding the right balance, and in this case, it is so that we can answer the question of whether fracking is or is not the solution to our energy independence.

To begin the discussion, please join me in giving a very warm welcome to our guest today, Greg Zuckerman. Thank you for joining us.

Remarks

GREGORY ZUCKERMAN: Thanks very much. It's a real honor and a privilege to be here to talk to you guys this morning. I hope everybody is sufficiently warmed after a cup of tea or coffee. If not, then hopefully this hot topic will warm people up a little bit.

I've done a lot of speaking over the last few months regarding my book. I've talked to both people in the energy industry and some opponents. I welcome the dialogue from both sides. Both have found reasons to be both critical and complimentary of my book. I'm sure there are other reasons people will point out today to both be critical and complimentary. I welcome them all. It's a topic that's fascinating to me.

I'm going to take a step back and talk a little bit about how I found this topic, why I wrote a book about fracking, of all things, why it's so important, and some lessons from the book and from this era of shocking energy resurgence in this country.

I am a reporter at *The Wall Street Journal*. I've been at *The Wall Street Journal* since late 1996, a long time, and I've done all kinds of different beats at the *Journal*, covering different financial markets and such. I realized a couple of years ago—probably around 2011, really—that there was really no topic more important to the economy and to geopolitics than this issue of how America somehow turned around and went from a position of desperation almost when it came to energy supplies and being dependent on others to a position of almost a glut when it comes to natural gas and even thinking about exporting oil.

It's an important business topic, and that's what I was looking for. I had written a book a few years ago and I was looking to write another one. But there were also some other aspects to the project that I found exciting.

I'm a big sports guy. I'm into writing about home runs and strikeouts. A lot of what I do is about people who make embarrassing mistakes, costly mistakes for their firms, for themselves. About a year and a half ago I broke the story about a "London whale," the trader at J.P. Morgan who almost blew up the bank or caused billions of dollars in losses.

I also write about home runs. I wrote a book a few years ago called *The Greatest Trade Ever*, which talks about the people that anticipated the financial meltdown and profited from it.

I find as a writer that there's a lot of drama when it comes to home runs and strikeouts. There are a lot of lessons also for the reader. So I'm drawn to those.

Again, it occurred to me that really there's no bigger home run going on in the U.S. economy, when it comes to an impact on cities and states and individuals and communities, than this energy revolution. We'll talk about some of the downsides. It's quite controversial, obviously. There are tremendous reasons to be concerned long term, but there are at least as many reasons to be excited.

And I'm also drawn to these kind of gray issues and gray characters. A lot of the people I write about are sort of gray. People have come up to me and they say, "Greg, I love these guys. I want to be like them," and other people say they hate them, they despise them: "What are they doing to this country?"

I love those kinds of differing reactions. That's what I want. I want people to have different reactions to the book and to the characters in the book.

So I want to take a step back. It strikes me that some people here probably know a lot about this energy resurgence and the impact, and other people probably don't know nearly as much. I'll go over some thumbnails and some bullet points to outline why it's so exciting and so remarkable.

Just a few years ago, even as recently as 2006, we as a nation were struggling to figure out where to get oil and gas. We were pumping about 5 million barrels a day of oil, and we were dependent, and worried about being dependent, on people that we didn't really want to depend on—Middle East nations, others that don't share many of our interests. And it was a difficult position. Many in the room obviously remember the oil embargo in the early 1970s. Ever since, we've been a nation worried about where we were going to feed that energy hunger.

Everything has turned on a dime. In other words, we've gone to about 9 billion barrels a day from 5 billion, just from 2006. It's going to keep going higher. Eleven or so billion is the expectation by 2020. Right now we're the biggest energy producer in the world. It's pretty remarkable if you think about just the changes.

I'm not a big believer in energy independence, but I am a believer that we're going to achieve energy security, which means that we will be in a position, I believe, in which we can depend on just ourselves and our friends—Canada, Mexico, and others. Right now we import about 7 percent of our oil from the Middle East. That's going to continue to drop. Again, that's just a remarkable turnaround for us as a nation.

Prices have come down. Natural gas prices have come down. There's a blip lately because, obviously, it has been really cold, but we pay about a third or a half of what they pay in Asia and in Europe. It has led to a rebirth in all kinds of industries. People are bringing companies back to this country, manufacturing and other kinds of industries. And I believe that we're on the cusp of an era of American economic dominance. It's not going to be something that's going to lead to necessarily remarkable growth—we are still in this sort of "new normal" environment—but relative to others, we've got this remarkable advantage. While other nations have their own shale deposits—Argentina, Mexico, Russia, China, etc.—it's going to take years for them to catch up to where we are.

It is going to help all kinds of different things and open up all kinds of possibilities for our leaders. Geopolitics is going to be transformed. I believe that the United States isn't going to be as involved at the margin in the Middle East. We're not going to feel the pressure to get involved. It's going to save lives. It's going to save money.

Then it opens up—we can talk about these things—what happens as a result? Do China and other kinds of countries that do depend on the Middle East become a little more involved in the Middle East? Do we want that? Do we not want that? There are all kinds of fascinating issues that, as I talk to military leaders and others, people are just starting to think about down in Washington.

Hillary Clinton—it's interesting—she was thinking early about these kinds of things, reorienting ourselves towards Asia. She talked about a little pivot towards Asia, and having energy be really key

to that. If she is elected in a few years, then you wonder if there will be more of a pivot away from the Middle East and whether the Kerry effort right now in the Middle East is sort of a last gasp in some ways. I think it may be.

So these are all kinds of fascinating issues and repercussions from this energy revolution. I have skimmed some of them.

The thing that propels me in this book is a real paradox. It's an interesting one because you wouldn't have expected the people that I write about in my book to have led this energy revolution. I'll talk about who they are in a minute. It wasn't the experts. It wasn't the specialists you would have expected.

To me, it reminds me a little bit of the financial meltdown. In the financial meltdown, who should have expected and anticipated the financial meltdown? It should have been Greenspan and Bernanke and heads of the banks, the big investors like George Soros and Bill Gross, those kinds of people. Instead—and I write about this in my first book—it was a group of outsiders. There's a guy named John Paulson who made $20 billion over two years anticipating the financial meltdown. He was a hedge fund manager. He knew nothing about housing before the financial meltdown. He was a "merger arb;" he bet on mergers.

There a few other people I write about in my book who are equally unlikely characters to have anticipated the financial meltdown. There's a guy named Jeffrey Greene, who is sort of a playboyish type out in Los Angeles. He made about $500 million betting on the financial meltdown. Just to give you a little flavor for him, his best man in his wedding was Mike Tyson. He had a houseguest for a while, Heidi Fleiss. Do you guys remember Heidi Fleiss, the "Hollywood Madam"? He's a guy who anticipated the financial meltdown.

There's another guy I write about named Andrew Lahde, a young hedge fund manager living in an apartment in Santa Monica, one of the biggest winners from that whole era. He was really convinced that housing was going to collapse. The only thing he was equally convinced of was that marijuana should be legalized.

Those are the guys that anticipated the financial meltdown, and we wouldn't have expected them to be. You have similar kinds of people and a similar phenomenon here with the energy revolution.

Who should have led this resurgence in U.S. production? Well, it should have been Exxon. Exxon is huge, right? Exxon is the biggest in the world. [*Editor's note: Check out Steve Coll's 2012 talk on ExxonMobil.*] Not only that, their headquarters literally, in Texas, is on top of the Barnett Shale. The Barnett Shale is the ground zero for this whole revolution. That's where we figured out as a nation how to get lots of natural gas from shale, this really compressed, challenging rock that looks a little bit like tombstone. Everyone said, "Forget about it." All the experts said, "Forget about trying to drill in America."

ExxonMobil was sitting on the shale. What did they do? They went anywhere but America. They went offshore. They went to Africa. They went to Asia**.** But they were drilling everywhere but underneath their own headquarters.

Who else should have been at the forefront of this revolution? Chevron. Chevron started a group in the 1990s to do unconventional drilling. That means drilling in things like shale, this rock that everyone said, "Don't even try." They were early. They had an up-and-coming manager running the group. They had pulled lots of talent from all over the company. I write about it in my book. And they

gave up on it. They said, "No, we're going offshore. We're going to Asia." People within Chevron undercut what they were trying to do in this little group, this really early, ambitious group. They couldn't pull it off.

BP, all the experts—Greenspan. Greenspan went to Congress around 2005 and he pleaded with Congress to set aside funds to build import terminals to import natural gas—to import natural gas! Lo and behold, there's a glut now. He got that completely wrong.

Some of the top investors on Wall Street all bet that natural gas prices were going higher because of peak oil, peak energy. Everyone read the books a few years ago. We were running out. There was a deal for TXU, which at the time was the largest leveraged buyout in the world, in 2007. The investors in that deal—and that was really a bet on this utility, and it was a bet that energy prices were going higher, natural gas prices were going higher—the investors in that deal were remarkable: Goldman Sachs, TPG, Buffett, KKR.

These were the smartest guys in the room, in the world, on the planet, and they all said the same thing: "The United States is running out of oil and gas, and there's no way we can get any more of it. There's no way to tap this shale rock that we've been sitting on in this country." They are all the experts, and they all got it wrong.

So who got it right? That's what I'm going to tell you. I'm going to talk a little bit about the characters in my book, the unlikely individuals who figured out how to get a lot of oil and gas, and caused the revolution and all kinds of controversy as a result.

The first is a guy named George Mitchell. Who is George Mitchell? George Mitchell is the son of a Greek goatherd. There are a lot of immigrants and children of immigrants in my book. My book is a very American book in a lot of ways.

So George Mitchell's father was a poor goatherd in Greece. He came over to America. Right off the boat he started working on the rail system, building the nation's rail system. He had a huge long name that I'm going to butcher, so I'm not going to try to pronounce it. [*Editor's note: His name was Savvas Paraskevopoulos*.] One day the foreman came to him, the paymaster came to him, and said, "I can't pronounce your name. What's with this name?"

George Mitchell's father said, "Well, what's your name?"

The foreman said, "My name is Mike Mitchell."

He said, "All right, I'll be Mike Mitchell, too." So he became Mike Mitchell, and his son is George Mitchell. It's a real immigrant story.

So George Mitchell is born in America. He starts a natural gas company in Texas. They're doing pretty well for a while. They are sending about 10 percent of Chicago's natural gas that they are responsible for. It's called Mitchell Energy. They're shipping it to Chicago. But he can see that his natural gas is running out. George Mitchell's a smart guy. He can see the writing on the wall. He says, "Guys, we don't have offshore assets and Asia and Africa, like Exxon. We've got to figure out how to get it from America."

The one thing they were sitting on was this layer of shale. Again, shale is just rock. It's very compressed rock. It's tough to produce oil and gas from. Again, they call it tombstone rock. It has always been sort of known as the source rock. Everyone in the industry knew about shale. There's

no mystery. Everyone knew it was packed with oil and gas. No one knew exactly how much, but everyone knew there was a lot of oil and gas in shale. But everyone assumed it was going to be too costly to get much out of it.

But George Mitchell didn't have a choice in the matter. He was running out of natural gas. He said, "Guys, let's go figure out how to get a lot of natural gas from shale in the Barnett Shale," which is in Texas.

He started a little group. They started in the early 1980s. By 1997, they are striking out. This little group isn't really making much headway. They are trying to frack it, which means fracture it. It sounds like a complicated word, but all it means is trying to create little fractures in the rock, little fissures that allow the gas to emerge. The way you do it is by just pummeling the rock with a mixture of water and a little bit of sand and a little bit of chemicals. They were trying every kind of way to get gas from it, and they were failing.

By then, George Mitchell was around 80 years of age. He wasn't really running things day to day. He had an heir apparent who didn't believe in what they were doing, and behind George Mitchell's back he was telling the guys in that group to give up—"Why are you wasting your time, you're killing us." George Mitchell's own son, who was on the board, was saying this is a waste of time.

But this little group—and I don't want to call them a rogue group; more like a stubborn group—they kept at it. George Mitchell, from his headquarters and from his home—by then he was semi-retired—he told them to keep going. Again, by 1997, there was real failure. George Mitchell had cancer by then. His wife had early Alzheimer's. It was sort of a last shot. And they finally made it happen. It was a little bit of luck. One day their contractor used too much water in their cocktail they used to pummel the rock, and it produced a good amount of gas. Everyone told this guy, the geologist in charge, Nick Steinsberger, "Well, this oil is a fluke. Don't read too much into it." And Steinsberger said, "Well, maybe I should read something into this. We're going to play with it. We're going to adjust it. We're going to keep at it."

Again, all the experts said he was a fool. But he was right, and the mixture that he figured out—mostly water, a little bit of chemicals, a little bit of sand—is the cocktail, the mixture that is used all over the world now, to some extent.

So they make it happen. They finally make it happen. George Mitchell sells his company. He's worth billions. Basically, everyone says, "Okay, you figured out how to get natural gas from shale in Texas, but that's just one little spot. It's a one-off thing. Who's to say you can do it elsewhere?"

Then a few other people said, "You know what? We're going to show you. We're going to prove that you can get lots of not just natural gas, but oil."

There's a guy I write about named Harold Hamm, again one of the most unlikely wildcatters in this whole era. Harold Hamm was born dirt-poor, one of 13 children in a little town in Oklahoma. He was so poor that he couldn't go to school. His parents were sharecroppers. They picked cotton and watermelon. Harold had to help in the fields, and he couldn't start school until around Christmastime because only by then was it so cold in the fields that he couldn't help his parents anymore. He didn't go to college.

He had this hunger, though, to find oil. He's like this throwback. He's like a real American archetype. You still had these people that hunger to find oil and make their wealth. He called it ancient wealth. He really had this hunger. He was a poor kid and he just wanted to find oil.

He didn't go to college, didn't know anything about geology, didn't know anything about drilling, didn't spend any time in the business. He started off—his first company, his first business, was cleaning out the bottom of trucks, tanker trucks. He started doing that for a few years. He dug in there and he dug out all the dirt. He worked really hard, and he built a little business, the cleaning, then trucking, and then started a little bit of wildcatting in Oklahoma.

He said he heard about what was going on in North Dakota. North Dakota has always been a boom and a bust state. There has always been oil there. There have always been failures that followed all the excitement. But he was a little stubborn, as were a lot of the people in this era. He said, "Guys, we're going up to North Dakota." First they started in Montana. The formation is called the Bakken formation. It's both in Montana and North Dakota. They started up there. They leased a lot of acreage up there. He got really excited.

But it wasn't working. This fracking was good, but you had to combine it with something else called horizontal drilling. Traditionally in the industry, you go vertically, but it's even better in some formations, because they are long and narrow, to drill down and then turn the drill bit 90 degrees and go horizontally. So he was trying to combine horizontal drilling and fracking in North Dakota.

It wasn't really working. They weren't getting much oil. As recently as 2006, 2005, he was trying to sell his acreage. No one wanted it. He owned the most acreage in the Bakken area. No one wanted it. He went to the big guys. He went to the small guys. No one wanted it. They ended up having to pare back their drilling, slow it down.

But they went ahead and kept doing it, tweaked it, and they figured out the way to do it. They weren't the only ones. Around the same time, other people were, too. They weren't necessarily pioneers. They figured out how to frack in stages. In other words, you pummel the water and the chemicals and the sand at the rock. But it was going everywhere. That was a real problem. So they figured out how to do it in stages and target it a little better. It led to remarkable amounts of oil that has been produced just in a few years.

In 2007, his company went public. It's called Continental Resources. It went up and then it went down. As recently as 2009, the stock was trading below its IPO [initial public offering] price. Then all of a sudden this remarkable amount of energy, of oil, started gushing out of the Bakken. Today this guy, Harold Hamm—who again was born dirt-poor, couldn't even go to school until Christmastime—he's worth $14 billion. He's one of the richest men in the world. He's so wealthy, he's worth more than the estate of Steve Jobs. He's going through a divorce, unfortunately, right now, but his wife is going to walk away with more money than Oprah Winfrey.

This is one of the successes. He's one of the unlikely success stories of this era. Again, it shouldn't have been Harold Hamm. It shouldn't have been George Mitchell.

I'll go quickly through a few of the other people that I write about in my book who are equally unlikely.

There's a guy named Aubrey McClendon and his pal, Tom Ward. I'm sure some people in this room know those two now that they have become a little more famous—or infamous. They weren't geologists. They weren't engineers. They didn't know much about drilling. They were land men. That means their specialty was to lease land around different areas. You have to be outgoing, charismatic. You have to be able to talk to a farmer and convince them why it's in their interest to lease their lands.

They were very different individuals. Aubrey was born on the right side of the tracks in Oklahoma. He

comes from the Kerr-McGee oil family. People assume he was wealthy growing up. He was. He was kind of upper middle class. He went to Duke, studied history. Again, he wasn't an energy expert, and yet he's leading this revolution.

He paired up with a guy named Tom Ward. Tom Ward came from the other side of the tracks in a small town in Oklahoma. His grandfather was an alcoholic. His father was a noted alcoholic. Women in that area were warned not to marry into the Ward family. I have talked to them. They weren't well-off.

He found religion, literally, and it stabilized him. He also became a lands man. He paired up with Aubrey. They were, in many ways, very different kinds of personalities. Aubrey was much more outgoing, Tom a little less so, although he's not as quiet and shy as people think.

They started this company called Chesapeake Energy. They had this hunger for land. They gobbled up land left and right. The stock went up, then the stock tumbled; the stock went up, the stock tumbled. But they were very early. They weren't the first ones. They were very early, around 2002, to realize (a) natural gas prices were going higher because we as a nation are shifting a little bit from coal to natural gas, and (b) that shale formations around the country were pretty exciting—the Marcellus, not too far from here, Pennsylvania and parts of New York, Utica, and others. They were early, and they gobbled up lands. It got to the point where, in 2008, they were each worth about $3 billion, again some of the richest people in America.

Then I write about how it all collapsed for them. In 2008, they took on too much leverage. I write about how Aubrey begged his lender, Goldman Sachs, not to give him a margin call. You can read about what happens.

Basically, they eventually get tossed out of their companies. But along the way, they produce so much gas—their company does; it helps produce so much gas—that it really leads to this glut in this country such that we're going to be exporting it.

They are starting over. In some ways, they hurt themselves. They weren't the victors and the beneficiaries, like Harold Hamm, from this era. But in some ways, we're all beneficiaries because we're all enjoying much cheaper natural gas as a result of them.

I'll just quickly talk about two other characters in my book. One is Charif Souki. Charif Souki, an immigrant from Lebanon—again, a lot of immigrants in my book, in my story—knew nothing about energy. He was a banker. Then he became a restaurateur. He owned the Mezzaluna restaurant in Los Angeles. Anyone know what that's famous for? O. J. Simpson—remember the murders? O. J. Simpson's ex-wife was there that evening, and Ron Goldman worked at Mezzaluna. Charif Souki owned that restaurant, and he owned some bars in Los Angeles.

He was a very smart, outgoing guy. Everyone was saying that we're running out of natural gas in this country. So he started a company, and they decided to import natural gas—actually, import LNG, liquefied natural gas, turn it into natural gas. They built these huge terminals in Louisiana to take imported liquefied natural gas and sell it in America. Everyone said we're running out of natural gas in this country.

Then, lo and behold, around 2007, he said, "Oh, my god, we made a huge mistake here. Not only do we not have a glut in this country, but I'm in trouble here, because my whole company's bet was that we're going to be running out of natural gas and we're going to need to import natural gas. Instead, there's a glut. What do I do?"

I give him a lot of credit. A lot of people would have just thrown in the towel. His stock was at, like, $1 a share. He had huge wealth at one point and it was all gone. He kind of swallowed his pride and he went to his board and said, "Guys, I have an idea here. You know that whole thing about importing natural gas? Well, how about we export it?"

At that point, they were sort of sick of Charif. They said, "Charif, good luck. Do what you want. The stock's at a dollar, so if we get anything out of our investment, we're fine."

And he did. He pulled it off. He's a very outgoing, charismatic guy, resilient. There's real resiliency in this book, these characters, and this country, I would argue. He pulled it off. He refitted the terminal. They're going to be the first to be exporting natural gas, starting next year. They are leading this whole era of exports.

The last guy is a guy named Mark Papa, who runs a company called EOG Energy. EOG Energy was sort of kicked out of Enron. Enron didn't really like what they were doing. Enron was about trading energy, and EOG—at one point it was Enron Oil & Gas—was about actually finding oil and gas. God forbid you should actually get your fingers dirty and look for something. Enron didn't want anything to do with that, so they spat it out. For a while no one really cared about EOG.

But Mark Papa was one of the first people to realize that there's this formation called the Eagle Ford in Texas that is really promising. It's shale, and it's packed with oil. "It's going to change the country," he said. Under the noses of the oil giants in Texas, he gobbled up all this acreage, he and his company did, among others, in the Eagle Ford. Now the company is worth about $45 billion. It's worth more than the combined value of Alcoa, Hershey's, and Southwest Airlines.

Again, you wouldn't have thought it would be EOG leading this whole revolution.

I'm just going to go through a few points about why it was these guys—at least why I think it was these individuals. I'd love to hear people's own thoughts. There are a couple just kind of random observations from this era. Then I'll stop for some Q&A, and I can discuss anything. We'll get into the whole environmental issue, which is a very important one, and the repercussions of this.

The first point I want to make about why it was these oddballs, these outsiders, is going to sound sort of clichéd, but necessity truly is the mother of invention. George Mitchell had to find natural gas, so he pushed his guys and they figured out how to make it happen in this spot in Texas. Charif Souki's company was falling apart. Yes, he could have thrown in the towel, but that's not fun either. So he said, "Guys, let's figure out how to refit our terminals and export natural gas, and get the approvals and figure out deals and get the backing and that kind of stuff." These guys had their backs against the wall, unlike Exxon. Exxon was still doing fine. I criticize them for not realizing that there was a revolution under its nose that was going to happen in this country, but in the end, they were fine. It's not like they're going under. They're making lots of money still.

It's a little bit like Merck and some others whose R&D [research and development] isn't what it used to be. When you get big, it's just harder to be flexible. It's easier for an EOG to gobble up acreage under the noses of the bigger guys, for those reasons.

Again, upstarts, just in general, are better than giants at innovating. You look at things like Google. Microsoft had an effort to do search years ago. They kind of didn't do anything with it. They allowed Google to step in there.

Two other points. I believe in the importance of market signals in capitalism. I think it's really

important that these guys had incentive to do what they did. They wanted to change the country, but they also wanted to get really, really rich. I'm among those who are concerned about the income inequality in this country, but this system also does create incentives for remarkable things and remarkable change. So along with the bad comes a lot of good. I think it's no coincidence that this revolution happened in America, which is still the bastion of capitalism.

There are also entrepreneurs in this country who still wake up every day and they want to find oil, they want to get rich, they want to be on the cover of *The Wall Street Journal* or something like that. As long as it's done without hurting others and hurting the environment, that's a good thing.

I also think that there's a real reminder—this era, and this book, reminds me—it has been very reassuring in some ways about this country and very discouraging about the country. It's reassuring to me in that—America gets all kinds of criticism for not innovating anymore. Smart guys—smarter than I—have made that criticism.

But traveling the country as I have done, to Oklahoma and Texas, Louisiana and North Dakota and Pennsylvania, you get away from the coasts and you see a resilience in this country. It's really impressive. There are young people making a good amount of money, making over $100,000 a year, without a lot of education, working really hard, overtime.

People from all over the country are flocking to North Dakota. If you ever have a chance to go to Williston, it's one of the most fascinating cities in the world. It's unbelievably cold—it makes this place look warm today—in the winter. In the summer it's hot and it's dirty and it's ugly. But it's a magnet for capitalism, in a good way. You have people that don't want to be on the dole. They don't want to be owing money. They get in a truck and they get in a car and they drive to North Dakota to get a job.

I give them a lot of credit. They leave their families often. It's not an easy life. But they want to turn their lives around and they're willing to work really hard.

I sat in a little hotel there, and there were people from all over the world—Japanese investors starting restaurants in Williston. It's a new gold rush. It's fascinating. It's really fascinating.

There are locals who are not happy about it as well, because real estate prices have just soared. In fact, you can really pay Manhattan prices for apartments there. Rentals are about $3,600 for a three-bedroom apartment, in Williston, North Dakota. If you have housing, you can make a lot of money, but if you don't, it's not an easy place.

There are more accidents now. It's not easy for women there. There are a lot of men there. I spent some time in a man camp. Actually, it was clean and safe, but if I'm a woman, it's not the best place in the world to be.

In that way, it has been really very reassuring about America's future. But it has also been a disturbing project, too, because, like any topic of importance today, fracking—I find there are very few people in the middle, in the center, very few centrists, as I consider myself. It's either "drill, baby, drill" or "fracking is poison." To me, it's somewhere in the middle, and we have to work together. Like politics and like some other issues of importance, there is very little move towards the center. My hope is that perhaps we are seeing some signs of people starting to work together and to make sure that production is done a little bit better.

I'll stop here. I'm going to make sure during the Q&A to talk a little bit about the environmental issues, because they are very important. I have spent a lot of time analyzing them. But I thought I'd take a

step back and let you guys have some questions.

Questions

JOANNE MYERS: As you say, this certainly is an American story.

I'd like to open the floor to questions, but before I do, I was wondering if you could just say a few words about the environmental concerns and then we'll move on.

GREGORY ZUCKERMAN: Sure. I've spent time examining the issue, because it's obviously a really important one and a hotly debated one. The way I view it is that both sides really overstate their arguments. Let me first discuss what the people nervous about fracking say.

The three key issues there are:

- That methane gets into the water. I'm sure many people have seen movies where they light a match and turn on a faucet in those areas and it blows up. It's very disturbing. That's one.
- The other is that chemicals are going to get into the water and we're going to ingest them. Some of these chemicals are fine and some of them are not ones we really want to be ingesting. They are very harmful. So that's the second concern.
- The third concern is earthquakes and tremors and things. We've read about that.

I'll tackle each of those one by one.

When it comes to methane getting into the water, it does happen. The problem is that it's usually or often nothing to do with fracking. I've traveled to these cities. Dimock is sort of ground zero for these concerns for a lot of these places. Dimock is a little city in Pennsylvania. I've talked to old-timers, and they say, "Greg, when I was in school, we used to go to school, turn on the faucet, light a match, and run for it, and it blew up."

The reason is that in some parts of this country natural gas naturally emits from the ground. It's rather shallow in the formation and it gets into the water. There are three towns in this country called Burning Springs as a result. There's a Burning Springs, Kentucky; there's a Burning Springs, New York; and I forget the third one. [*Editor's note: West Virginia.*] The Native Americans used to light it to impress others.

Often—not always; often—the methane that you see in those movies and others that gets into the water—and it does—it's natural and it has always been there.

That's the issue about methane. I'm going to come back to where the industry has it wrong.

The second is the chemicals. Chemicals are a concern, because you don't want to be ingesting them. But if you talk to scientists, as I did, most of them say that it's unlikely these chemicals, which are drilled way down in the ground, are somehow going to come up to our water table. In most of the areas where we're drilling, we could go as low as 14,000 feet. Thirteen thousand feet below the surface is where they are doing the wells. Our water system is much higher. It's about 400 feet or lower. It's possible that the chemicals are going to rise over time**,** but it's really unlikely, again, if you talk to scientists.

The third area is the issue of tremors and earthquakes. The truth of the matter is there haven't been, really, earthquakes. There have been more tremors. Sometimes you feel them; sometimes you don't. It's not necessarily an issue of fracking. It's afterwards. It's injecting back into the ground. Supposedly they can do a better job of figuring out where to inject the waste afterwards. But it's an issue in some areas. Supposedly the industry is doing a better job at figuring things out ahead of time.

So that's why I'm not that concerned about the environmental issues when it comes to fracking. That's why I say fracking can be done properly.

The problem is, it often isn't being done properly. That's where the industry has it all wrong. There are many examples—and I document them in my book—of leaks. There's different data about it, but I've seen data that in as many as one in ten wells, the casing surrounding the well has to be remediated, as they call it. It has to be improved. That's very disconcerting. You can get problems there. There are spills. It's noisy. It's dirty. The air pollution it has caused is clear.

There have been all kinds of towns really split and impacted by this. There are about 5 million gallons of water per well when you frack. First of all, you need a lot of fresh water, and it causes all kinds of truck usage in these areas. There are trucks going back and forth, back and forth when there's fracking.

So the industry messes up left and right, over and over again. Again I document it in my book. My argument—and it's not just my view; it's the view of others like the Environmental Defense Fund—is that we're going to be fracking in this country. About 90 percent of wells in this country right now are fracked. So let's work with the industry and let's put pressure on them and make sure they do a better job and do it safely, as opposed to just sort of condemning it. And they're going to go on doing it anyway.

To expect this nation, still digging out of the deepest economic downturn since the Great Depression, to say, "Yeah, we're sitting on some of the biggest, most remarkable natural gas and oil formations in the world. We're not going to do anything with it. We're going to keep shipping money to places like Venezuela," is a lot to expect of a country. Even as our population grows and our energy needs increase—and, frankly, we're not yet ready, unfortunately, for wind and solar and alternatives. We're going to get there.

My view is that, just like it took George Mitchell from 1982 to 1998 to figure out the breakthrough when it came to fracking, it's going to take incremental work when it comes to alternatives. We're getting there. But we have spent an estimated $2 trillion around the world on alternatives over the past 20 years, and we haven't made that much progress. So it's going to take a while.

This, to me, hopefully is a bridge to that better world where we can be dependent on alternatives. That's my hope. Maybe I'm naïve, but I see reason for that view: We are making progress. Solar is improving, and wind. But we're not quite there yet.

QUESTION: I'm John Richardson.

I just want to try and simplify it by offering you a question. As I understand it, the scientists seem to agree that natural gas burns cleaner, so that that end product burns cleaner. We've had maybe 150 years, but more like 100 years, of oil. We know oil pollutes to some extent. Coal pollutes maybe more.

If the natural gas burns cleaner and we can control the input in terms of the energy expended and the pollution created to get this, why don't we convert everything to natural gas tomorrow? Trucks, cars. It's easily done technically.

GREGORY ZUCKERMAN: First let me address your first question. Production of natural gas, through fracking or any other means, likely is better than coal. We're not sure yet. We think, but unfortunately the data isn't really convincing yet, the reason being that so much methane escapes during the production of natural gas that it could make it worse than coal. We don't think right now that it is. We think that it's better than coal. If you look at the data, because we have shifted from coal at the margin to natural gas in this country, our carbon dioxide emissions have fallen. We're back to 1994 levels.

It's crazy. We never signed Kyoto. We sort of dismissed it. All the Europeans got excited about it. But our carbon dioxide emissions are dropping and theirs are growing. I was just over in Europe. It's a fascinating thing. Literally in the UK, they're buying our coal. We're shipping coal to Newcastle. It's a fascinating thing to me. It's crazy. And it's because we are shifting at the margin to natural gas from coal. There are all kinds of other reasons why, for the air, natural gas is better than coal.

There's still a lot of competing data. We're still trying to figure it out. The problem is, again, we do emit way too much—too much methane escapes during the production and the fracking, in the production of natural gas. They're getting better at it. They say they don't want to lose the natural gas, but they do it anyway. They burn it off. If you travel North Dakota at night, it's beautiful. They're burning up the natural gas. It's fascinating to see. So the industry is aware of this issue of the methane leakage, and they are working on improving it, hopefully enough. So it probably is better to produce natural gas.

The second question is, why aren't we shifting? We are, slowly but surely. Buses and taxicabs in major cities around the world—not just ours, but elsewhere, too—there are infrastructure issues and there's a cost involved in that. Someone has to pay that.

But I'm in favor of a tax on oil, on natural gas. Use some of that money, not so much to send to the Solyndras of the world, but for infrastructure, for wind as well. Wind is intermittent, and we need a better infrastructure there. So I would invest in that kind of thing.

QUESTION: Marilyn Rittenour.

I'd like you to talk a little bit about regulation. My understanding in Washington last year was that there isn't a lot of control of the chemicals that go into the fracking at the state or federal level. And that seems to be a concern. Is there more regulation for this now?

GREGORY ZUCKERMAN: It has gotten better. It's interesting. There's a real divide in how we in the media, on the coasts, view the energy guys and the people in the energy business, and how they view themselves, and how they really are. When I started this project, I assumed that they were sort of cigar-chomping, Houston boardroom guys, giggling their way to the bank, spilling oil and gas left and right—"Oh, sorry, guys." But the more you talk to them, you realize that they are outdoors people. They hunt. They fish. They are geologists a lot of times. They like rock. I sit at my desk. They are out there. They're not trying to do bad things. They often do bad things. Let me make that clear. BP and elsewhere—spills are synonymous with that industry, sadly. But they're not out to pollute.

So early on, they said, "We're not telling you what we put in this concoction, this fracking concoction." It's all a mixture of water and sand and some chemicals, but it's their secret sauce, and

they spent years on it; they literally spent years on it. They say, "We don't want to give that up. Why should we? We spent years on it. We're just going to tell everyone about it?"

They did a horrible job of public relations early on. Early on, companies like Cabot in Pennsylvania were drilling in areas of the state where they hadn't been doing that much drilling for many years, if ever—elsewhere, obviously, in Pennsylvania, but not so much in those areas. So they weren't that familiar with the geology. They made huge mistakes. They didn't own up to them. One of the mistakes was not realizing, well, yes, it's your secret sauce, but you're going to scare people.

Slowly but surely—slowly—they realized, "Okay, we do have to share what we're putting into these chemicals," and they have begun sharing them. I think in about 25 states now they tell you what they are putting in their concoctions. But there are exceptions. They can still get some exceptions to prevent regulators from knowing about it. They do this FracFocus. They share much more. It has gotten much better, but it's not where we need to be.

QUESTION: I'm Edward Marschner.

Do you see an opportunity for political leadership on this issue, where our political leaders can help shape the intelligence of the public on it?

GREGORY ZUCKERMAN: It's a good question. When I go on Fox, they talk about how Obama has gotten in the way of this revolution. Some of the pioneers, like Harold Hamm, have this vociferous criticism of President Obama. I say to Harold Hamm, "You're worth $14 billion. You've made it mostly during the Obama administration. He couldn't have been that bad. Let's be honest here."

They have sort of stayed out of it. I think that's a good thing in a lot of ways. Obama now has gotten around—exactly a year ago, in the State of the Union address, he talked about 100 years of gas. He has embraced it. It's creating a lot of jobs. The unions love it. You go to North Dakota, and if you don't have a job, it's because you don't want a job.

So politicians have come around and have embraced this revolution. This is one of the only boom industries in this country.

Could they be doing much more? Yes. Look at Governor Cuomo, who can't make a decision. Yes, we can do gambling in upstate New York, but counties that want to do fracking—and I'm all for it, if counties don't want to do it. There are some beautiful parts of this state and Pennsylvania, rolling areas. If they don't want to do fracking, that's fine by me. If people don't want to lease, good for them. But they should be allowed to if they want to. Or make a decision and talk to the scientists and come to a conclusion.

I would argue that there should be more leadership in terms of the infrastructure I was talking about and enabling wind. But I'm not such a big fan of picking out alternative energy companies that should get money from the government. I'm a big believer in markets. There is a role for government officials, but I get nervous when they have too big a role.

QUESTION: Bob James. I'm a businessman here.

Listen, has there ever been a successful lawsuit against Exxon or somebody like that, or small people like me about fracking? I say that because fracking has been going on for 70 years, a different kind of fracking than we have now.

GREGORY ZUCKERMAN: Let me address a couple of your points. Yes, the industry says, "We've been fracking since the 1950s"—and we have—"and people are all excited about it now." The problem is, we haven't been fracking in shale. There is different pressure involved. We don't have enough data yet, I would argue, on shale to dismiss fracking and say there's nothing wrong with fracking; why is everyone getting excited about it?

There have been lawsuits, but many, if not all, of them have been settled. There have been some payments.

The industry has messed up. They own up to it. There are leaks, spills. It gets into the water. They're getting better at it, though. If you look at the data on Pennsylvania, in terms of the complaints, they have gone down. You can argue maybe that the regulators aren't doing a good enough job. But I'd like to think that industry is doing a better job at producing oil and gas safely through fracking.

So there have been suits. A lot of them have been settled, as well they should be. That's fine.

QUESTION: Andrew Quale, Sidley Austin.

You mentioned that certain countries—Argentina, Russia—also have shale resources, but they will be way behind. It seems to me that, the way you described it, the United States has moved dramatically fast in developing this technology, so I wouldn't think it would take them that long to develop their own resources.

The question is, are certain countries going to benefit from this technology dramatically in the next, say, decade or even less, and are those the same countries that have already had substantial oil resources? Or is this distribution of, shall we say, natural wealth going to be different and spread out in a different way?

Just a historical question: The Oil Shale Corporation, Tosco, which I recall in my youth as a lawyer in the United States, in New York—was that in the same area or was that in a totally different area?

GREGORY ZUCKERMAN: I'll address your second question first. Oil shale is a cousin, sort of, of shale oil, believe it or not. Oil shale is just oil that really is like teenage oil that hasn't really grown yet. We've got it in Colorado. They've got it in Israel and some other places.

That's sort of like the next book. That's different. Someday maybe they will figure that out. They have been talking about that forever. That's horrible for the environment, the production of oil shale. That's different. This is shale oil and shale gas.

I'm going to address your first question. That's exactly what I thought when I started my book, that the rest of the world has their own pockets and deep formations full of oil and gas in shale—Argentina, Mexico, the UK, Poland, Russia, China. I figured it was just a matter of time before they caught up. But when you start doing some work on it, you realize that they will catch up, but it's going to take a while. We've got tremendous advantages.

Before I get there, we as a nation really have to be pulling for China to start fracking and to start embracing this revolution, because if you care about global warming, if you believe in global warming, the only way we can make a dent into global warming is to get China to shift from coal to natural gas. The only way they are going to do that is through fracking. So I really hope—and I think over time they are going to.

But the real advantage we have in America—we have capital markets that allocate capital quickly. We've got a pipeline system. We've got more rigs than anybody in the world. We've got a better formation. In China their formation of shale is in an area that has had earthquakes before. It's very deep. They don't have the clean water that we have, the access to water that we do, that helps us. There are a lot of advantages.

And we have entrepreneurs. You could say China has done pretty well for itself in the last few years, with its own model of government, and they haven't needed necessarily—the government is more involved, and they haven't needed these same kinds of wildcatters. But I think it has helped us; this entrepreneurial spirit has helped us.

There are a lot of advantages that we have that other countries don't have. In the UK—I have spent a lot of time there recently—individuals don't own their own mineral rights. The crown does. That's true in South Africa and other countries as well—most countries. We're one of the only countries where we own our own mineral rights. You can cut deals with an entrepreneur as a result. If you want to lease my backyard, make me an offer. That helps this process. You don't have that in other countries.

So we have advantages here. Eventually they will catch up. Some of the same wildcatters that I have dealt with and specialists are going to China. They are trying to work with them and trying to help them figure it out. I bet you, if Hillary is elected—or somebody else—we're going to over time encourage the Chinese to try to shift to fracking and natural gas, because that's the only way we can do something about global warming.

QUESTION: Jane Joseph.

I was wondering what you thought of the fairly recent development, of which Apache, I think, has taken advantage, of using things such as carbon dioxide or other substances, other than water, to do the shale gas exploration. Their intention was not so much environmental. I think it was more about cost. But do you think this is something that is going to catch on, and if it does, will they have to change the name of hydraulic fracturing?

GREGORY ZUCKERMAN: Apache has done that. Others are doing things like recycling much more water and making improvements there. When you talk to engineers and geologists in the field, it's really impressive, the amount of innovation going on. They are finding new formations. There's an argument that this era isn't going to last that long—"Yeah, you've got a lot of shale oil and gas, but it depletes quickly." And it does. But the guys know that in the field, and they keep finding new formations. They keep finding better ways to drill. They are very efficient.

I've been really impressed. I make the argument that we as a nation do a few things better than the rest of the world: We make rap stars, we have apps, we do drones pretty well, and we frack really well. We innovate in the field. You get discouraged living on the East Coast. I've got family on the West Coast. You get a little bit discouraged about our future as a nation. But when you talk to guys in Oklahoma, Pennsylvania, North Dakota, they continue to innovate. They are trying to cut costs, but also they are aware of these environmental concerns. They're not necessarily the greatest people in the world. They're not the worst people in the world. They're just trying to make a living and avoid the scrutiny of people doing good work, the environmentalists out there holding their feet to the fire.

I love that. Again, that's my kind of theme: Let's work with them. Let's put pressure on them. There are some states doing that. Colorado, California, Wyoming recently have new laws and statutes about testing. I embrace that. I think we should all do that. Hopefully there's more of that.

JOANNE MYERS: Greg, thank you for really a fascinating discussion on a very important topic. That was great. Thank you.

Audio

Thanks to fracking and the unlikely characters who made this revolution happen, the United State is now the biggest energy producer in the world. The environmental hazards can be overcome, argues Gregory Zuckerman, and the fracking bonanza is here to stay. So our best course is to work with the industry to improve safety standards.

Video Clip

Thanks to fracking and the unlikely characters who made this revolution happen, the United State is now the biggest energy producer in the world. The environmental hazards can be overcome, argues Gregory Zuckerman, and the fracking bonanza is here to stay. So our best course is to work with the industry to improve safety standards.

Read More: Corporations, Energy, Oil, World Economy, Business, Environment/Sustainable Development, Ethics in Business, Extractive Industries, Global Financial Crisis, Private Sector Development/Corporate, China, United States