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Atmospheric services industry may emerge from oil and gas

By John C. Roper, Staff writer Updated 12:06 pm CST, Friday, January 18, 2019



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John Gibson is the chairman of energy technology at Tudor, Pickering, Holt & Co. on Thursday, Dec. 27, 2018, in Houston. Tudor, Pickering, Holt & Co. is an integrated investment and merchant bank.

John Gibson sees carbon tax credits as a step toward what he calls a new "atmospheric services industry."

As chairman of Tudor, Pickering, Holt & Co.'s energy technology efforts, Gibson's job is to help Houston's emerging technology companies with investment bank advisory services. The E-Tech team also focuses on introducing breakthrough companies to energy clients.

Gibson also shares his thoughts in occasional e-newsletters. And in a recent edition,

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he talked about a possible transformation of the oil and gas industry, using its core competencies to save the planet from greenhouse gas. There is a financial incentive to reduce carbon dioxide. Some see it

decade of his energy career and chief executive officer at Halliburton.

misplaced. What did you

nal. In Charles Darwin's book, Darwin writes about being at puff-adder behind it. And he it, and he knew he was

perfectly sure because he had glass in place. He found he couldn't do it. He immediately jerked away. He couldn't stop himself. Climate change to me is very difficult for mankind to understand yet. But we've evolved understanding snakes and developed a natural reaction to a threat from snakes - whether it's venomous or not venomous, we have an identical reaction. There's a reason for that. Being able to jump away from a snake made you live longer. As a consequence, I look at climate change and I don't want to argue whether it's venomous or not, I just want to tell you that our survivability will be greatly enhanced if we jump away from it, if we react to it, no matter what you believe.

Q: How should people react to it?

A: I think we should respond to it as though it was real, whether you believe it is or isn't. It's in our best interest for the planet to treat climate change as though it is venomous. Because I think our survivability will be much greater if we just react to it as if it could harm us. And if it can't, then so what? We have a better place to live. And

what's the problem with that?

Q: Is fear the best motivator to get people to address climate change?

A: Fear to me is the greatest motivator. We got Sarbanes-Oxley, not out of the thinking that everything was great, but out of the fear that people were purposely misstating information. We got the Patriot Act out of the fear that our citizens might be involved in terroristic acts in America. Almost everything that we see that has the kind of significance that climate does is motivated by fear.

Q: What about fear mongering?

A: You have a group of people who exploit it for their benefit. We've had people who have financially benefited and gained research dollars by trying to use climate just for the purpose of fear. And they've gotten beyond the science, and that hurts their credibility. Just like it hurts the credibility of people who deny it by not looking at the data. I'm a scientist at heart and I just want to look at the facts and I want to react in an appropriate way to the snake. I think you have to treat it as though it can hurt you and then it's okay.

Q: How has oil and gas industry reacted to this?

A: Slowly at first. I would say it has gone from denial to acceptance and I think we're about to move into sort of the commercialization of atmospheric services. We've gone from 'this is not a problem' to 'we're beginning to understand this is a problem and we need to deal with it' to 'we need to be a part of this to solve the problem.'

Q: Explain atmospheric services.

A: To really understand where the world is going, let's start with the atmosphere. We've got molecules that probably have a negative impact on the planet in one way or another and we want to manage those.

Q: You mean taking carbon dioxide out of the atmosphere.

A: Right now, the most intriguing is CO₂ because that's what we're emitting. And

actually, the oil and gas industry, oddly enough, is not the problem. It's the transportation and the power industry. It's just happens that we extract the fuel that they use. We're not the ones creating the CO₂ but we are the ones uniquely qualified to deal with it.

Q: How so?

A: There was a study done at the Bureau of Economic Geology (in Houston) of offshore Miocene gas reservoirs. What they did was think through what the best containers are to put CO₂ in. You'd like to know that when you put it there it will stay. Well it turns out that if you put it into a gas reservoir, which had already been holding gas for millions of years, it should be able to hold it for millions of years. This is not rocket science here. We're going to look for something that had gas and we're going to put gas back.

Q: Where are some of the best reservoirs to turn into CO₂ storage containers?

A: You'd like to have really good data so that you can understand the container and the faulting and the lateral extent of it. In offshore Texas Gulf of Mexico waters, we have beautiful seismic data so it's a lot easier to image and to continuously get images offshore than it is to work onshore where you have obstructions like roads and buildings. You've also got thousands of wells and well logs that allow you to characterize these containers and then the most significant thing of all is you've only got one owner that you need to deal with and that's the state of Texas. It simplifies things when you're not having to deal with 50 landowners with varying emotions. You can actually deal very scientifically with the state. And you have very little to no risk of drinking water contamination by putting it offshore. You also have huge amount of CO₂ generation right along the Gulf Coast, because that's where the refineries are, that's where your power generation plants are, so you've got CO₂ sources along the Gulf Coast.

Q: How much storage is there and how much is needed?

A: The atmosphere carries about 750 to 800 gigatons of CO₂ naturally. Fossil fuels annually contribute about 30 to 35 gigatons of CO₂ into the atmosphere to produce energy. So about 5 percent of the CO₂ in the atmosphere is being generated above the carbon cycle. We've been adding CO₂ to the atmosphere over the last 100 years as a

result of using hydrocarbons. We've been blessed because the ocean has been able to take up some of it and the soil has been able to take up some. We now have the ocean probably carrying too much CO₂. We're going to have to deal with the oceanic levels of CO₂ someday as well.

Now the (the Bureau of Economic Geology) estimates that Miocene reservoirs (in the Texas Gulf of Mexico), which are at depths of 1,000 feet to 3,000 feet, have a storage capacity of 30 gigatons. That's a year's worth of fossil fuel CO₂ emissions on the planet. And that's just one set of containers in a place where everything lines up to where it looks like you could put it there. Now the estimates for the U.S. are that we have somewhere between 2,000 and 22,000 gigatons of CO₂ storage available to us in the subsurface. Say we have just 3,000 gigatons of storage available, that's 100 years of CO₂ storage available to us in North America alone. That's at the low end. If we get up to 20,000, that's 600 or 700 years.

Q: So the problem is obviously not having enough space to dispose of the CO₂.

A: Our problem is getting it out of the atmosphere and transferring it or changing what we're doing for emissions so that we capture it. There are two things that we need to do: We need to reduce the amount that we're creating, and that doesn't mean getting rid of it entirely, necessarily, it means converting it to a capturable form rather than releasing it to the atmosphere. And then we need direct-air capture so that we can actually modify the atmosphere itself. And this is what makes it so cool to me.

Q: Any examples on how to capture CO₂ before it releases into the atmosphere?

A: When you get into your car, and you fill up your tank, let's say you have a 20-gallon tank. Gasoline weighs about 6.3 pounds per gallon, so you've got about 120 pounds of gasoline in your car. Now for every gallon of gasoline, you create about 20 pounds of CO₂, so it's about a three times expansion in terms of the amount of CO₂ by weight that you created in gallons of gasoline. If you had a car that was 100 percent efficient and capturing CO₂, you'd put 20 gallons on one side and put a tank on the other side that when you got done, you'd have 400 pounds of CO₂ in it to dispose. That's how much you're emitting out of your car from the tailpipe into the atmosphere because of how the molecules combine. You'd have to change the way you think about things, but you could actually use gasoline on one side of the car and capture CO₂ on the other. That's

not an outrageous vision.

Q: What about capturing CO2 from the atmosphere?

A: We haven't had a president like (John F.) Kennedy in half a century. He said we're going to go to the moon and come back safely. And we need somebody that says, "We're going to manage this atmosphere because this is a great planet for life indefinitely and we're going to do it in the next decade." That's a great vision. It aligns research, it aligns industry. It's a vision where globally you can execute that. What Kennedy did with his vision for space was he transformed things where he had no idea what would happen, like telecommunications. We now have revenue-generating objects that are not on the planet. That's awesome. And the same thing is going to happen when we tackle the atmosphere. We're going to have capabilities that take us well beyond where we are today. It's going to be an enabler for us for colonization of other planets.

Q: How far away are we to this being a reality?

A: My whole goal is to have us think. It's not rational with the technology we have today. But it's a way of educating people about what they do when they combust gasoline. In five years, you're not going to see the progress we all want. We'll still be fighting (about climate change). But in 10 years, I think we're going to have abilities that will surpass your imagination.

Q: What industry do you think has the best shot at being in the atmospheric business?

A: The oil and gas industry will lead this because they own the containers, they own the knowledge of how to fill those containers. They're the ones with the competencies to put things in there and take them out. They're the ones that understand how to make things stay there, how to abandon wells, how to avoid contamination of aquifers and how to maintain the integrity of the wellbore. The oil and gas industry knows more about putting stuff in the ground and taking it out than any other industry. Period. And that's where we are if we want to manage the climate.

Q: What would it take to get the oil and gas industry to take this on?

A: It's not going to be altruism. They've got to make a return to shareholders. The real

crux to this is how do we create a carbon industry? It's not just having 45Q (the recently passed tax credit that calls for deployment of carbon capture and storage projects), it's making that permanent, so people can count on it long-term for a business. Otherwise, they won't invest in it. I think on the carbon side, we're going to have to see a move from policy to permanence. If people can count on this for 50 years, then they can try to understand the viability of it financially. But we really need financial incentives, or nothing changes.

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