Earth and Sky – John Barry

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Intro speaker: You're listening to John Barry of Shell. And this is Earth Sky's Clear Voices for Science. Barry is talking about the problem of global warming. And CO2 or carbon dioxide emissions. He leads Shell's efforts to manage CO2, through a technology called carbon dioxide capture and storage. He spoke with Earth Sky's Jorge Salazar about the technology.

Interviewer: Dr Barry, welcome to Earth Sky's Clear Voices for Science.

Barry: Thank you, very much. Pleased to be here.

Interviewer: Here in the US there is still some controversy over how big an impact that carbon and other emissions will make on the world through global warming. What is Shell's point of view on this?

Barry: You'll appreciate that we are not in Shell climate scientists. And rather than add one more to the many voices which are speaking out on this around the world, I think I would just like to refer to the excellent work done by the intergovernmental panel on climate change. Work which received the Nobel prize last year. And the panel of leading scientists from countries all around the world, paint a very unattractive picture of a world, in which we don't do something to mitigate green house gas emissions or carbon dioxide emissions as we sometimes say. It's a world in which there will be increasing extreme weather events, difficult access to water, increasing impact on food production, even on disease in some of the extreme longer term scenarios. So I think we can take it that the scientific consensus tells us that there is a problem and action is needed as quickly as possible.

Interviewer: Will you please help us provide some context on this issue? Tell us a little bit about how much carbon dioxide goes into the atmosphere each year, now, in contrast to a time before the industrial revolution.

Barry: So the amount of CO2 which is being emitted each year from manmade sources at the moment, is around about 30 billion tons. So that's 30,000 million tons a year. If you go back sufficiently far in history of course the answer is zero from manmade sources, or very small levels. From cavemen burning a few fires. So you can see it is a really major amount of CO2 which is being emitted, it's ramped up very dramatically,

more than a factor of 10 over the last couple of hundred years as the industrial revolutions happened. And we already start to hear that the scientists are seeing some signs of impact. There are some evidences emerging of some mild temperature response, but we know that the CO2 concentration in the atmosphere has gone up measurably in recent years. That is happening with a rise of a part per million or so every year, and we also know that it is not so much what has happened so far that's the problem, it's what's going to happen over the next hundred years if we don't start to manage the problem.

Interviewer: I understand that you are leading efforts to deal with the carbon that is going into the atmosphere. And some of these efforts are called carbon dioxide capture and storage. What is carbon dioxide capture and storage?

Barry: Carbon dioxide capture and storage is one of the technologies that offers the most promise for making a difference to CO2 emissions in the short to medium term. When I say that, I'm thinking 10 or 20 years. A 100 years out maybe there'll be technologies we haven't thought of today, but what we do know is that there are many large point sources of CO2 emissions around the world. Think of power stations, for example, burning fossil fuels, coal or gas. Think of oil refineries, in my own business, they use quite a lot of energy to generate the fuel we use to drive our vehicles. Because they are point sources, the CO2 is emitted in one place rather than, for example like a car where it is emitted all over the town. You actually have a hope of capturing that CO2 at the point source, using some sort of a chemical technology to capture the carbon dioxide out of the exhaust gas, and take it to a place where you can store it, safely deep underground. That's potentially one of the most promising technologies because about a third of the emissions today, are coming from things like power stations, where this sort of technology might be applicable and might make a pretty radical difference to the CO2 emissions from those power stations.

Interviewer: What impact will this have on taking the CO2 out of the atmosphere? How much CO2 can it stop from entering the atmosphere and what impact would this have on things such as fuel - tell me more about this.

Barry: If we choose the right place to inject the CO2 underground, and I'm thinking of reservoir knowledge that our geologists have, for example, they will be guiding us towards the rocks, deep below surface, 2 or 3 kilometres, a mile or so down, which are suitable for the injection of CO2. The CO2 will stay down there for the long term. We can be fairly confident in saying that. So all of the CO2 that is captured and injected is effectively taken out of the atmosphere. It will take some time to start doing this on a major scale. We've done some calculations and we think that rolling out carbon capture and storage, from about 2020 onwards on a large scale, will avoid about 230 gigatons, or 230 billion tons if you like, of CO2 going into the atmosphere by 2050, the middle of

the century. To put that in context, that's around 6 years of CO2 emissions at today's levels. So it is a really material contribution to reducing the CO2 emitted into the atmosphere from the stationary point sources, the power sector and some industries. Sorry, second part of the question. You asked me about the impact on fuel, and I don't want to lose that point. Fuel comes out of refineries, and of course to get into the refinery we have to use some energy to produce crude oil and transport it to the refinery. Those processing actions, the production, the transport and the refining, typically are responsible for about 15% of the CO2 that's emitted from a litre of fuel used in a car, or a gallon of fuel, if you're in the US. 85% of the emissions come from the actual combustion of the fuel in the motor vehicle, that is the typical figure. And of course, if we do carbon capture and storage in our refineries, for example, it won't change the 85% figure, what it will do, it will help us reduce the 15% of emissions involved in actually producing the fuel. So it will have a beneficial impact on what we might call the carbon footprint of a gallon of fuel. Just as supermarkets are starting to label some of their products with CO2 content, you might like to think of carbon capture and storage helping produce a lower carbon content driving fuel.

Extro speaker: That was John Barry, vice president for unconventional oil and enhanced oil recovery with Shell. He was speaking about carbon dioxide capture and storage. Our thanks today to Shell, encouraging dialogue on the energy challenge. To subscribe to this and other free science podcasts, visit the subscribe page at earthsky.org. I am Deborah Bird, and you're listening to Earth Sky's Clear Voices for Science. We're at earthsky.org.