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## *Sustainability: Impacts and Issues*

Q&A

MODERATOR: JOHN KIRBY  
*South Dakota State University  
Brookings, SD*

*Art Zimiga (Rapid City School District):* Throughout America, corn is grown as a staple. If we use it for ethanol, what impact will it have on people who continue to need it as a staple? I ask because this very land that we are on right here was tall grass. To some people that was a burden, but to the Lakota people it had its proper place in a relationship. Western civilization came in and plowed up the land and planted pastures, and pretty soon they overgrazed it and then made farmland. Here we are in the twenty-first century, and my question is: How are you going to include the native peoples' knowledge, not just of the land but of the relationship of the plant kingdom with mankind?

*Suzanne Hunt:* All of our choices from the energy matrix now in place are highly dependent on policies. The future 10, 20, 30 years depends on the path we choose. If our vision of the future for this area is a return to prairie grasses, with energy from wind and the sun and from biomass, that may be different from the vision that other people have. You could go to policymakers and share your vision and the wisdom of the native people and, thus, influence policy. This next decade is going to be extremely important. We've hit a tipping point in terms of realization that the global climate issue is, indeed, very serious. The gases that, for decades, we've been dumping into the atmosphere in huge quantities are having effects. Combined with oil-security issues and need for rural development in many parts of the world, a perfect storm is in the making. But it takes time to develop new technologies and we are finally seeing significant investment towards achievement of renewable energy systems. The next 10 years will be critical and I am glad that you wish to contribute to the decision-making process.

*Brendan Jordan:* Native cultures probably have much knowledge of possible value-added medicinal products from plants and how to manage complex agricultural systems like polycultures and prairie ecosystems. There's widespread management of a variety of ecological systems with fire, and we're just starting to understand now how to manage them with a different type of disturbance—biomass removal. I think there is great opportunity to learn from fire-disturbance management to figure out what the differences are from harvest removal. I think there are huge opportunities. Thank you for bringing it up.

*William Richards:* Renewable energy presents the opportunity to return these prairies to grasses. Our 25×25 study shows that the two most profitable crops by 2025 will be corn and switchgrass, or some other variety of biomass, which are two of the best soil-building crops. With the appropriate technology and policy, we have the opportunity to return these prairies to close to their original condition.

*Richard Flavell (Ceres, Inc.):* Each of you has been associated with the production of analyses and reports and you've referred to many other reports. Each of you has also talked about what is going on in Congress, so my question is: Are you confident that the decision makers have the right vision? Have they got the right detail? Do they have the right understanding to make the right legislation in the Farm Bill and so on—to make sure this gets off the ground and everybody in the value chain wins?

*Hunt:* My first reaction would be “no,” just to answer it simply. A few have good staff who are doing their homework, but that's probably the exception rather than the rule. The biofuels industry needs to work with the research community to improve environmental practices and also improve the environmental image because there is a growing backlash. Along with public education there is need for education of decision makers. An election is coming up with Iowa an important state. Everyone will be paying attention. But, do they have the right and the best information on biofuels? A number of groups are starting to realize that in DC, but it definitely needs more effort.

*Steven Bantz:* I agree that the short answer to the question is “no.” We need more information and we need to learn a lot. Some of the bills before Congress propose that—as we go down this path—impact studies are done to provide the option to, for instance, change the renewable fuels goal. The Environmental Protection Agency announced that they are planning a detailed analysis in the upper Midwest on the impacts of biofuels, which will help. A lot of the reports and studies that we reference come out of academia, and we need federal agencies to step up and work together—the USDA, Environmental Protection Agency and Department of Energy—to develop sustainability criteria, and quantify greenhouse gas impacts of fuels. There are holes in the current data—big holes—for instance, impacts of land-use changes on climate. A lot of the life-cycle analyses of biofuels don't incorporate land-use changes, and we need to figure out the best way to do that. Many people are working with policymakers to put language into legislation to deal with some of these sustainability issues and put a carbon framework in place so we can quantify greenhouse-gas impacts from the choices we make.

*Richards:* I would be a little more positive. My answer to your question is “not yet.” Congress is a product of the public. Until the public sees the problem, how do we expect Congress to see it? There has been much hype on high prices at the pump and danger of high food prices, but until the lights go dim or there are lines at the gas pump, we probably won’t get change. I hope we get it before that.

*Jordan:* I echo the sentiment that the politicians writing the Farm Bill cannot have better information about this than the society they work for. Probably we all have some kind of Farm Bill position each differing in certain respects, and that’s what the politicians are getting. In any case, our elected officials will not let lack of knowledge stop them from doing something. There’s going to be a lot in this bill about energy. I think that Bill Richards is right. As a society, we need to figure out what the path forward is and once we achieve a consensus it will be relatively easy for politicians to figure out the right path forward.

*Flavell:* There’s the information dimension, but there’s also the time dimension. What can we do to help Congress make decisions in accordance with their own timescales of expectation?

*Jordan:* There are two ways to look at that issue. There’s the actual writing of the Farm Bill but there’s also the follow-up, and I’m pretty confident that this bill will have the tools necessary to start getting projects up and running. The best way to respond may be by pooling projects together—using whatever tools are available—to find the answers we need. Anyone else have a better idea?

*Hunt:* Yes, also give input on timeframes. Politicians love to have bold sound-bite goals like “twenty-five by twenty-five.” But are these realistic, and if they are and if that’s where we are going we should put a line in the sand, and at some point we may have to admit that we have serious problems—we need to get to “X” by “Y”—which may require policy changes. Improving information sharing was mentioned. A bio-energy wiki has been created, and is available at [www.bioenergywiki.net](http://www.bioenergywiki.net) with information on research in Minnesota, South Dakota, *etc.*, with potential to interact with counterparts at Cornell, Syracuse, *etc.* We have a lot to do to ensure that the right information goes to politicians. It seems that we are talking a lot to ourselves and less to politicians or the public in ways they can understand.

*Ralph Hardy (NABC):* Mr. Richards, can you expand on your comments on switchgrass and provide targets on tons/acre, cost to produce per ton, *et cetera*?

*Richards:* That came out of the Tennessee study, projecting corn out to 2025. It was a 198-bushel US average from the technology we have. The slope of the last few years might get us there before 2025. Switchgrass was at \$60/ton and 10 tons/acre, figuring we are going to get some improvement in yield. We need good data on what it will cost to get switchgrass to a client. It didn’t assume any breakthrough in gasification or other technology.

*Hardy:* So, you are projecting a gross of \$600–700/acre from corn and a gross of \$600 from switchgrass. Can you give figures on the cost side?

*Richards:* We don't really know what the cost of that corn will be. It depends on cost of nitrogen and seed technologies. That was assuming increase in fuel needs over the country. You'll have to read the study as to where they were pegging oil at that time, but I do remember that those two crops stuck out because soybean had dropped off and wheat had dropped way back—cotton was just about holding its own—so those figures were exciting to me as a corn farmer and a conservationist.

*Jordan:* This isn't directly answering your question and I hesitate to throw too many numbers out there without having my spreadsheets in front of me, but on the perennial side I think a number of potential drivers could improve the economics of those systems. As Bill mentioned, one is inputs. Growing switchgrass or a native grass polyculture requires much less nitrogen. The other potential driver is a climate policy. Already the North Dakota and Minnesota Farmers' Union and Iowa Farm Bureau are starting to aggregate carbon credits and sell them into the Chicago Climate Exchange. As the price of those credits increases—presuming it does—it will tip the scales towards perennial systems that have the capacity to sequester more carbon. I'd be happy to point out specific numbers to you when I have them in front of me and to share with you costs of production, baling, harvesting and transportation.

*Audience Member:* We've talked about policy as a strong driver and the current political coalition for biofuels is strong, but what looming threats do you see to that coalition 5 or 10 years down the road, and what should we be doing today to ensure that the coalition remains strong for as long as possible?

*Richards:* Well the threats on our 25×'25 vision are coming real fast from the livestock community. They are quite upset about the corn prices and the feed costs that they now have. I remember way back in school that they taught us that cheap corn brings cheap hogs and *vice-versa*, and if you look at what's happened there's nothing that will cure high prices like high prices. So, these prices will adjust. The best thing that could happen to us is to have a great corn yield this year. We would be a whole lot better off as farmers with \$3–3.20 corn and a good crop than—God forbid—\$5 corn and lose a whole bunch of a market and our future. We're beginning to get quite a push back on our 25×'25 goals because of feed costs and a lot of talk of food costs. However, I'm surprised—the figures that I'm getting from economists indicate that food costs are not going up as much as you might think. So it's going to be an interesting summer, both for production and in terms of what the public learns and feels and does about renewable energy.

*Jordan:* One potential obstacle—once we've satisfied the nation's blending requirements for ethanol, the price of ethanol is likely to decrease. An analysis from the Center for Agricultural and Rural Development at Iowa State University indicates risk of some plant

failures in the coming years as we satisfy the national blending requirement unless we come up with policy to increase the requirement. Did I get that right?

*Richards:* As I understand the arithmetic, it takes 7 to 8 billion gallons to satisfy the octane needs—it's almost an automatic market there for us. If we get the 10% blend over the country that will take 15 billion gallons, about 15 billion bushels of corn. We'll probably reach that 15 billion bushel corn crop by 2015. In fact, as a corn farmer, I look at the improvements in yield and our crops even in problem years and wonder what we would do without ethanol. The potential—it's so exciting. In the Iowa study, they used base numbers of \$3, \$3.20 for corn, and assumed the price of oil at about where it is. Hey—raise the price of oil and everything goes up, including the energy that it takes to haul food to our tables. I don't want to say the study was unfair, but the reporting of it really bothered us.

*Bantz:* It addresses the supply side—renewable energy from biofuels and other types of energy—and seriously addresses the demand side: vehicle efficiency, and efficiency of our homes and businesses. We won't dig ourselves out of this hole unless we seriously address the demand side.

*Hunt:* Part of the push back could come from public opinion. The media want things that are simple, and they want things that are dramatic. They love negative stories too. I've been getting more and more calls on negative aspects of biofuels: are they going to make people starve? We don't want to see Bono doing charity concerts for the starving in Africa because of biofuels. I don't think I can stress this enough. We need to make sure that we don't lose people who might be supportive. Renewable energy, including sustainable biofuels, needs to become part of our culture. Much like smoking was the sexiest thing to do in the 1950s, whereas now you're basically a social outcast if you smoke—I'm hoping that the current energy system will go the same way, that 20 years from now no one will think of putting gasoline in their car. It has to be a cultural shift.

*Carol Hanley (University of Kentucky):* One of the things I've heard a lot of you talk about is changing public opinion and public awareness and your media events and getting information transfer. I'm here because we do a lot of professional development for teachers and we work directly with students, and that is an effective way to get information to the places where it can do the most good. In my profession, I don't see a lot with biofuels programs for teachers or students yet. We see little tiny pieces. In Lexington, KY, we are trying to initiate a program of community-based science for students and teachers, and you've given me so many ideas. If anybody would like to help me write or fund a proposal, or go in together on a proposal—I'm serious. You all know how effective it is to increase public awareness and knowledge via the legislature, but going through teachers and children is also effective way to do it, and I'm willing to work with anybody who is willing to work with me.

*William Gibbons (South Dakota State University):* I'll just add to that—one of the things that we are trying to do is get students involved in this industry because the industry needs the workers.

*Audience Member:* If the biofuels industry takes off, does it mean the end of the petroleum industry? Will they compete or work in synchrony? Can the biofuels industry reach everyone who is accessible to the petroleum industry?

*Hunt:* Never underestimate the power and resources of the oil industry. Exxon is now the most profitable company in history. BP just invested \$500 million in research on advanced biofuels. Shell has invested quite a bit of money. We are starting to see huge investments. And they can hire the best talent and they have the best resources, including the best lobbying resources. I think you will see them do what the car industry did with electric vehicles, for example, when California passed its no emission vehicle law they took a two-pronged approach. They developed an electric vehicle, in case they would need it, and they fought the law. The oil industry is going to fight biofuels on one side, and quietly invest in it. When it becomes more beneficial financially to make money from biofuels they can switch over. I think they are going to win no matter what.

*Jordan:* The oil companies will be fine. Don't worry.

*Bantz:* They won't go away soon. We will be blending biofuels with petroleum products for quite a while. But I do want to add to an earlier question. Al Gore and others have helped to educate people, influencing the discourse on climate change. States like California are establishing comprehensive climate-change policies, which is needed at the federal level. And people are now working on this at the federal level. Whether new policies will be enacted this session or not, nobody knows. But this will drive a lot of what happens in the energy industry in the next decade.

*Haluk Gedikoglu (University of Missouri):* Gasoline prices in the United States are still much lower than in other countries. I don't see any incentive for consumers to decrease their fuel consumption or for automakers to create more efficient cars. In Europe, taxes are based on the size of the engine, so there is a demand for more-efficient vehicles. Do you think we will see policies that encourage consumer awareness?

*Bantz:* No politician wants to suggest a carbon tax or a tax on fossil-fuel usage because increasing taxes is so unpopular in this country. You are exactly right: as gas prices increase, eventually consumption decreases, but not nearly enough. Fuel-efficiency mandates will be needed to obtain improved fuel economy in a timely manner.

*Richards:* Until the public starts backing away at the gas pump, they are not getting the economic signal that it's a problem. Are the automakers getting the signal? Well, we hear that they are not doing so well. I traded my 2001 car for the 2006 equivalent—same

make, same everything—and the mileage went down by 5 mpg. We've got to change this. Detroit has to get the message that mileage and efficiency matter. But will they? We are using more fuel than when prices were cheaper, so the economic signal isn't there.

*Bantz:* The big three like to say that they are participating in helping to lower greenhouse-gas emissions by producing more flex-fuel vehicles, but if you look at the flex-fuel vehicles that are on the market, most of them are large fuel-guzzlers. Also, they are getting a CAFE credit for producing those flex-fuel vehicles, which ends up making us consume more petroleum over all. The automakers need to stop pointing fingers at other people because they are a big part of the solution. However, they are also very strong in Washington as are the oil companies. It's not an easy battle, but we as consumers need to demand more choices when we walk into the showroom, for example a flex-fuel vehicle that gets 40 mpg.

*Hunt:* The 1981 Volkswagen Rabbit pick-up that I drove on a recent trip through Central America got 40 mpg from biodiesel. Henry Ford would say, "Well, this looks about the same as when I left." If you consider advances in sound technology and medicine, if this were really a priority we could get there. We could double the efficiency of the American fleet if we just had the average mpg in Europe. On one hand we need to use our consumer pressure and on the other hand policymakers need to put the policies in place. The car companies are always saying, "Consumers aren't asking for this. They want sexier, faster cars." Henry Ford is quoted as saying, "If I had asked consumers what they wanted they would have said 'faster horses.'" We need to be smarter, and we should be thinking more about what we need and less about what consumers want.