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# *Economics and Sustainability*

## *Q&A*

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*William Gibbons (South Dakota State University):* The Farm Bill is coming up. What is the status of the policy proposals?

*Wally Tyner:* The policy proposals are all over different pieces of legislation. Senator Lugar has introduced the variable subsidy in a bill by itself. The Senate bills that were referred to yesterday contain the biofuel standard. No one yet is doing the two-part subsidy. We just finished the initial work on that last week, but the paper that I did today is on Senator Lugar's website on the two-part subsidy, and, if they decide they are interested in that, it will go in another piece of legislation. Most of these things will probably end up more in energy legislation than in ag legislation, but, at the end of the day, who knows? Right now, everybody is trying to get their names on some bill. Everybody wants to be "green." Everybody wants to be "bio-energy." All kinds of bills are floating around to do all kinds of things. Most of them will die, but I'm optimistic that we will get some kind of significant policy change, but we will need to adjust it as we go.

*Audience Member:* I have a question about current US farm policy. You said we don't like to tax, but consumers pay military expenses from their income tax and also the subsidy for ethanol. Do you think it might be better for consumers to decrease fuel consumption and pay a little more at the pump than finance these two policies?

*Tyner:* You're right. These costs are paid by consumers through the government budget. Some of them are paid by consumers through the level of activity in the economy, so it depends on which one of the costs we are talking about. But consumers pay one way or the other, either through the government budget or through economic activity. I didn't mean to imply that I would be opposed to taxes. I'm a realist and what I see are possibilities. People that I work with on the Hill indicate that they are interested in supply-side alternatives, such as subsidies, or demand-side alternatives such as standards or regulations, or combinations of those. So that's what we have focused on so far. But if the door is open to other alternatives we'd be happy to look at them. Right now we've been told, send a clear message, that these are the ones we want to look at.

*Audience Member:* This is a question for our Canadian colleagues. Is there a significant amount of importation of biofuels into Canada, or is it like the United States where farm lobbies are opposed to such importation?

*Danny Le Roy:* In terms of HS codes, ethanol could possibly come in in two separate codes and given the way the statistics are recorded it's not evident to a user such as myself or perhaps even to Wally, to decipher the amount of alcohol coming in and what proportion is vehicle fuel. Having said that, the amount imported is relatively small. Given the mandate in Canada, it's clear that we're not going to realize targets without some increase in imports. And the question is: where is it going to come from? We have a counterproductive policy in Canada, *e.g.* an import tax on ethanol from Brazil. There's some work to do.

*Maria Wellisch:* I understand that Ontario is importing. It's one of the provinces that has its own mandate and I think it's importing from Brazil. The amounts are small but will have to grow because production won't be sufficient to meet that renewable-content regulation.

*Audience Member:* Professor Tyner, you are quoted in this morning's *Argus Leader* regarding the biofuels bill introduced by Senator Thune from South Dakota and Senator Nelson from Nebraska. One quick question and then probably a follow-up. Have you read the specific legislation yet?

*Tyner:* No, they got me on the phone and summarized what the bill said. I had read a draft of it. My comments were based on my recollection of what was in the draft plus what is in the press release.

*Audience Member:* The *Argus Leader* may not have given you a good description of the bill, but you're quoted as saying that a "build it and they will come" notion on either side doesn't work, that you have to have firm signed contracts before you plant. You are also quoted as saying that you don't see any reason why we need to have this switchgrass sitting around waiting on somebody to think about someday, maybe, possibly deciding to build a plant. I don't know if that's a correct quote, but it's probably at least fairly close. The legislation itself—since I don't know if you've seen the final version actually—requires that it be within a 70-mile radius of an existing or proposed facility. It also has to have a letter of intent from the facility to use that biomass. As you are well aware, the technology isn't quite there yet—hopefully within 5 to 10 years we'll have it. Producers right now aren't growing switchgrass. There's no commercial use for it. If we start growing it now, then by the time it becomes economically viable we'll have a crop to use in place. I'd say it's wrong that they have to have a facility. It's not a "build it and they will come" thing for them to actually be a part of this project. There has to be a facility or a proposed facility there. And I don't know if you had seen that in the legislation yet.

*Tyner:* If that is true, then you don't need it either, because if it's true that there is a proposed facility the first thing a facility is going to do is get a contract signed. They can't afford to break ground until they have feedstock. If Roger Wyse were still here, he would tell you that's absolutely the case. So, the first step is to guarantee a feedstock. They have to have it under long-term contract. These plants are really expensive and there are many sources of risk. It's technology, it's oil price, it's raw material, and one of the risks that you can reduce is the raw material risk and you do that by getting signed contracts and you do that *before* you build the plant. Nobody can put the hundreds of millions of dollars into these plants and hope that maybe there would be feedstock there. They have to have that ahead of time.

*Audience Member:* Very fair point. There's actually the industry that signed off on this aspect of it because they're not going to get folks to turn around and build something which they can't collect anything on for 5 to 10 years. I understand your concern with corn to cellulosic ethanol, that transition, but with corn at current prices, why would a farmer or producer give up that cash cow to put in switchgrass, when they aren't going to receive any money for 5 to 10 years. Processors are not going to be able to lock up contracts; producers are going to rather just do corn. Switchgrass is 5 to 10 years down the road, but, to make it economically viable, producers must be involved and the purpose of the legislation includes mediating some of the risk you are talking about. The producers are going to have a risk and that's the purpose of the legislation. The main thing I wanted to know is if you had actually seen the final product of the legislation.

*Tyner:* Many alternatives will be put on the table, and we have to try to find those that are least costly. My assessment is that that particular approach is a pretty costly approach, but we have to keep them all on the table. We have to look at them all, do the analyses and see what shakes out.

*Audience Member:* For our Canadian colleagues: Canola was not on your list, although it's a pretty big Canadian crop. I know that folks in the southeastern United States are thinking about using canola as a biodiesel feedstock. Can you address why you didn't include it and if the cost of canola oil is too high for biodiesel?

*Le Roy:* That's the story. Given the current price of diesel in Canada, making biodiesel from canola is very expensive. It was recently announced that Dominion Energy Services is building a 100-million US-gallon biodiesel plant in Alberta, for which a major feedstock will be rendered animal fats from the packing plants in that part of the province. In terms of the inputs to make biodiesel, the price of canola is high. Several other inputs could be used at much lower cost. It wasn't mentioned in my presentation because at this point it's not economic, and probably will not be economic in the foreseeable future.

*Wellisch:* We are exporting canola to Europe for biodiesel production. Same comment on high-input cost. There's a little bit in terms of the regulation—the 2% replacement

of diesel with renewable—and there's a little caveat there that it needs to be shown to be effective, *etc.*, so they have a question mark on the biodiesel target and perhaps are leaving a little bit of room to wiggle out of it. We were initially told that we were going to be using all this waste grease to produce all this biodiesel—and that's happening to a certain extent—but also we hear of some operational difficulties. Canola is easier to work with, but more expensive, so we need to work that out.

*Audience Member:* Dr. Tyner, does the increase in markets for co-products and/or concurrent development of biomaterials significantly impact the economic development and/or policy positions?

*Tyner:* Certainly—I assume you are talking about DDGS and other similar co-products—absolutely critical. DDGS went up from \$80 to \$130 as corn went up. It's back down to \$105 now. It's not a throw-away product. It's critical to the economics of ethanol production and all the numbers that I showed—we have a quantitative relationship between corn prices and DDGS prices built in to all those breakeven numbers. All of the co-products are important.

*Audience Member:* What about biopolymers and other materials?

*Tyner:* They could be very important down the road. We don't have them in any of our models. We develop process models for each one of the technologies and then we overlay the policy alternatives on those, and we haven't yet developed process models for the biopolymers/biomaterials. It's a much more complicated process. If somebody has funding we'd be happy to do it, but we haven't done that yet.

*Ralph Hardy (NABC):* As you are planning long term and you look at agricultural starches to ethanol, you look at perennial grasses, you look at woody crops like willows and you look at forestry—a huge resource in Canada compared to the United States—as we look 10 years down the road, assuming we have technology to economically convert biomass to ethanol by that time, which of those is going to be the prime source for a bioliquid fuel in Canada?

*Le Roy:* I guess the flippant answer is that my crystal ball is as cloudy as yours. But, I think that you are right when it comes to the forestry resources and wood chips. There might be some potential with switchgrass and at this point it might be technologically feasible. Iogen has been in the news an awful lot in Canada; it was even mentioned in the federal government's budget in March. But, it's a long way off yet and I'm reluctant to make a forecast 10 years out.

*Wellisch:* We'll see a mixture of solutions. Across the country we have different opportunities in terms of feedstock and different capacity and capital capacity; it's going to depend on where you are. On the lignocellulosic side, we have a huge forest resource.

But the industry is in very poor shape and they are working on some forest biorefineries, *etc.* Right now we see more support federally for agriculture, helping farmers to increase income. I think we are going to see the lignocellulose side move ahead using agricultural feedstocks, drawing on the US DOE developments. But we are also going to see biogas projects, gasification and pyrolysis of a mixture of feedstocks, municipal solid waste for example. So I think the thermochemical conversion and then transformation into fuels may be closer in the near term. Sustainable Development Technology Canada (SDTC) has a biofuels roadmap and they list the near-term technologies and where they see things fit on a time line. That's a good resource for a better picture.

*Allan Eaglesham (NABC):* Mark, what do you do currently with the solid material that's produced at the back end of your process? You mentioned possibly using it for cellulosic ethanol in the future. What critical aspects will influence your decision as to whether you develop this cellulosic ethanol potential?

*Mark Kraeger:* Right now, it's simply composted and goes to the land—it's a fertilizer product. Wal-Mart is buying it. I have a love-hate relationship with Wal-Mart. As far as what stands in the way of going on with cellulosic ethanol, it's really just proving the process. We've identified a company that, interestingly enough, is struggling. They've had some venture capital put into them and they can't seem to make their system work economically. They can make it work, but they can't make it work economically. With our system, because of all the other components that already exist, we don't have to have a distillation column. We don't think that we need another fermentor. Certainly no freight is involved in getting the feedstock. It will work within our system if, in fact, they can crack those molecules like they think they can. Testing is hopefully going to start here in the next 60 days and we'll start learning some things.

*Tony Shelton (Cornell University):* Dr. Tyner, I wonder if you could explain to me—a non-economist—the current subsidy for ethanol of \$0.51/gallon. What are the components that go into that \$0.51 and who gets it?

*Tyner:* The \$0.51 is the federal subsidy that's known as a blender's credit and it's paid directly to the entity that blends the ethanol—domestically produced or foreign produced—with gasoline, either in E10 or E85. The *initial* payment is to the blender. VeraSun might sell ethanol to Shell Oil, and Shell will blend it with their gasoline. So Shell gets the subsidy. Shell is able to pay Verisun more for the ethanol because they are getting that subsidy so a good part of it—most of it—is passed back to VeraSun, passed back to corn and as someone said today, that ultimately a lot of it gets passed back to the landowner in today's world. During the last 25 years most of it has stayed in the system, off the land, but now that the demand has pulled the corn price up as we've heard several times, a lot of the subsidy is heading straight back to the land like most income strings from agricultural commodities. So the initial payment is to the blender, then to the producer of the ethanol, then to the corn grower, then to the landowner. That's the economic trace of that subsidy.

*Larry Smart (College of Environmental Science and Forestry):* Mark, how reliably is your anaerobic digester working? What is your down-time? Is it a batch or is it a continuous process? How much power are you generating? Are you generating heat only or are you also generating electricity?

*Kraeger:* The process is continuous. No electricity is made because the efficiency of BTU conversion to electricity is something like 30% whereas to thermal heat is 80%, and so we rely on the high-efficiency BTU conversion. Reliability—it's been operating every day since August so the process is still in start-up. The technology we are using was designed at RCM in Berkeley, California—Mark Mosher put the engineering together. He has facilities that have been operating continuously for 20 years with zero down-time. The down-time he experiences is with the electricity generators because they have to stop and change the oil, whereas we're burning it all on boilers and there's no down time there.