S. HRG. 111–521

THE ROLE OF AGRICULTURE AND FORESTRY IN GLOBAL WARMING LEGISLATION

HEARING

BEFORE THE

COMMITTEE ON AGRICULTURE, NUTRITION, AND FORESTRY

UNITED STATES SENATE

ONE HUNDRED ELEVENTH CONGRESS

FIRST SESSION

JULY 22, 2009

Printed for the use of the
Committee on Agriculture, Nutrition, and Forestry

Available via the World Wide Web: http://www.agriculture.senate.gov

U.S. GOVERNMENT PRINTING OFFICE

56–563 PDF WASHINGTON : 2010

For sale by the Superintendent of Documents, U.S. Government Printing Office
Internet: bookstore.gpo.gov Phone: toll free (866) 512–1800; DC area (202) 512–1800
Fax: (202) 512–2104 Mail: Stop IDCC, Washington, DC 20402–0001

COMMITTEE ON AGRICULTURE, NUTRITION, AND FORESTRY

TOM HARKIN, Iowa, *Chairman*

PATRICK J. LEAHY, Vermont
KENT CONRAD, North Dakota
MAX BAUCUS, Montana
BLANCHE L. LINCOLN, Arkansas
DEBBIE A. STABENOW, Michigan
E. BENJAMIN NELSON, Nebraska
SHERROD BROWN, Ohio
ROBERT P. CASEY, Jr., Pennsylvania
AMY KLOBUCHAR, Minnesota
KIRSTEN GILLIBRAND, New York
MICHAEL BENNET, Colorado

SAXBY CHAMBLISS, Georgia
RICHARD G. LUGAR, Indiana
THAD COCHRAN, Mississippi
MITCH MCCONNELL, Kentucky
PAT ROBERTS, Kansas
MIKE JOHANNS, Nebraska
CHARLES E. GRASSLEY, Iowa
JOHN THUNE, South Dakota

MARK HALVERSON, *Majority Staff Director*
JESSICA L. WILLIAMS, *Chief Clerk*
MARTHA SCOTT POINDEXTER, *Minority Staff Director*
VERNIE HUBERT, *Minority Chief Counsel*

CONTENTS

Page

HEARING(S):

The Role of Agriculture and Forestry in Global Warming Legislation 1

Wednesday, July 22, 2009

STATEMENTS PRESENTED BY SENATORS

Harkin, Hon. Tom, U.S. Senator from the State of Iowa, Chairman, Committee on Agriculture, Nutrition, and Forestry 1
Chambliss, Hon. Saxby, U.S. Senator from the State of Georgia 3
Grassley, Hon. Charles E., U.S. Senator from the State of Iowa 5

Panel I

Grumet, Jason, Founder and President, Bipartisan Policy Center 13
Johnson, Roger, President, National Farmers Union 6
Pierce, Jo, Family Tree Farmer on behalf of the Forest Climate Working Group 11
Stallman, Bob, President, American Farm Bureau Federation 8

Panel II

Holdren, John P., Ph.D., Director, White House Office of Science and Technology 46
Jackson, Lisa, Administrator, U.S. Environmental Protection Agency 44
Vilsack, Hon. Tom, Secretary of Agriculture, U.S. Department of Agriculture . 41

APPENDIX

PREPARED STATEMENTS:

Grumet, Jason 74
Holdren, John P. 79
Jackson, Lisa 88
Johnson, Roger 90
Pierce, Jo 100
Stallman, Bob 106
Vilsack, Hon. Tom 119

DOCUMENT(S) SUBMITTED FOR THE RECORD:

Vilsack, Hon. Tom:

"A preliminary Analysis of the Effects of HR 2454 on U.S. Agriculture", Office of the Chief Economist 124

Grumet, Jason:

"Forging The Climate Consensus—Managing Economic Risk in a Greenhouse Gas Cap-and Trade Program", National Commission on Energy Policy 137
CountryMark, prepared statement 148
E.I. DuPont de Nemours and Company, Inc., prepared statement 154
International Biochar Initiative, prepared statement 159
John Deere, prepared statement 163
National Alliance of Forest Owners, prepared statement 170
National Cattlemen's Beef Association, prepared statement 180
National Cotton Council, prepared statement 184

Page

Grumet, Jason—Continued
National Oilseed Processors Association, prepared statement 186
PG&E Corporation, prepared statement 196
SynGest, prepared statement 199
The Dow Chemical Company, prepared statement 200
The Fertilizer Institute, prepared statement 206
The Nature Conservancy, prepared statement 211
Various Organizations, prepared statement 215
QUESTION AND ANSWER:
Harkin, Hon. Tom:
Written questions for Hon. Tom Vilsack 218
Written questions for Joe Pierce 288
Written questions for Lisa Jackson 266
Written questions for John Holdren 260
Written questions for Jason Grumet 255
Chambliss, Hon. Saxby:
Written questions for Hon. Tom Vilsack 221
Written questions for Lisa Jackson 266
Brown, Hon. Sherrod:
Written questions for Hon. Tom Vilsack 230
Gillibrand, Hon. Kirsten E.:
Written questions for Hon. Tom Vilsack 249
Written questions for Lisa Jackson 281
Grassley, Hon. Charles E.:
Written questions for Roger Johnson 284
Written questions for Bob Stallman 294
Written questions for Hon. Tom Vilsack 243
Written questions for Lisa Jackson 273
Written questions for Jason Grumet 259
Written questions for John Holdren 265
Johanns, Hon. Mike:
Written questions for Hon. Tom Vilsack 231
Written questions for Lisa Jackson 269
Leahy, Hon. Patrick J.:
Written questions for Hon. Tom Vilsack 223
Written questions for John Holdren 262
Written questions for Lisa Jackson 268
Lincoln, Hon. Blanche, L.:
Written questions for Hon. Tom Vilsack 228
Written questions for Joe Pierce 290
Written questions for Jason Grumet 258
Written questions for Roger Johnson 283
Roberts, Hon. Pat:
Written questions for Hon. Tom Vilsack 230
Written questions for Lisa Jackson 269
Thune, Hon. John:
Written questions for Hon. Tom Vilsack 242
Written questions for Lisa Jackson 278
Grumet, Jason:
Written response to questions from Hon. Tom Harkin 255
Written response to questions from Hon. Charles E. Grassley 259
Written response to questions from Hon. Blanche L. Lincoln 258
Holdren, John P.:
Written response to questions from Hon. Tom Harkin 260
Written response to questions from Hon. Charles E. Grassley 265
Written response to questions from Hon. Patrick J. Leahy 263
Jackson, Lisa:
Written response to questions from Hon. Tom Harkin 266
Written response to questions from Hon. Saxby Chambliss 267
Written response to questions from Hon. Kirsten E. Gillibrand 281
Written response to questions from Hon. Charles E. Grassley 274
Written response to questions from Hon. Mike Johanns 270
Written response to questions from Hon. Patrick J. Leahy 268
Written response to questions from Hon. Pat Roberts 269
Written response to questions from Hon. John Thune 278
Johnson, Roger:
Written response to questions from Hon. Charles E. Grassley 284

Page

Johnson, Roger—Continued
Written response to questions from Hon. Blanche L. Lincoln 283
Pierce, Jo:
Written response to questions from Hon. Tom Harkin 288
Written response to questions from Hon. Blanche L. Lincoln 290
Written response to questions from Hon. Charles E. Grassley 291
Stallman, Bob:
Written response to questions from Hon. Blanche L. Lincoln 293
Written response to questions from Hon. Charles E. Grassley 294
Vilsack, Hon. Tom:
Written response to questions from Hon. Tom Harkin 218
Written response to questions from Hon. Saxby Chambliss 221
Written response to questions from Hon. Sherrod Brown 230
Written response to questions from Hon. Kirsten E. Gillibrand 249
Written response to questions from Hon. Charles E. Grassley 243
Written response to questions from Hon. Mike Johanns 232
Written response to questions from Hon. Patrick J. Leahy 223
Written response to questions from Hon. Blanche L. Lincoln 228
Written response to questions from Hon. Pat Roberts 231
Written response to questions from Hon. John Thune 242

THE ROLE OF AGRICULTURE AND FORESTRY IN GLOBAL WARMING LEGISLATION

Wednesday, July 22, 2009

U.S. SENATE,
COMMITTEE ON AGRICULTURE, NUTRITION AND FORESTRY,
Washington, DC

The Committee met, pursuant to notice, at 10:03 a.m., in room 325, Russell Senate Office Building, Hon. Tom Harkin, Chairman of the Committee, presiding.

Present: Senators Harkin, Leahy, Lincoln, Stabenow, Nelson, Brown, Casey, Klobuchar, Bennet, Chambliss, Lugar, Cochran, Roberts, Johanns, Grassley, and Thune.

STATEMENT OF HON. TOM HARKIN, U.S. SENATOR FROM THE STATE OF IOWA, CHAIRMAN, COMMITTEE ON AGRICULTURE, NUTRITION, AND FORESTRY

Chairman HARKIN. Good morning. The Senate Committee on Agriculture, Nutrition and Forestry will come to order.

I welcome this hearing to examine the critical challenges in energy and global warming and the pending proposals for addressing them. We have two strong panels of witnesses, and I look forward to their testimony. We will have this first panel this morning. Then, we have to take a break, and, because of the necessity of us being on the Senate floor for a constitutional issue at 2, this Committee will resume its sitting with Secretary Vilsack and Administrator Jackson and others this afternoon at 2:30.

For decades now, we have known that our American way of buying and consuming energy is not only unsustainable but dangerous to our future. Our heavy reliance on fossil fuels, much of it imported, is a threat to our energy, economic and national security.

In April 1977, when I was a second term member of the House, President Carter called for a new course in energy policy because he believed our very strength and future as a Nation were in peril. He called the task the moral equivalent of war. That speech was a grim and sober one, though remarkably prescient. Yet, just a few years later, the warning was largely discarded and disregarded.

Today, our energy situation is even more precarious. We import about 70 percent of the oil we use, much of that from nations that are unfriendly or politically unstable or both. Repeated oil price shocks, topping at over $140 a barrel last summer, are a drumbeat driving home our vulnerability. Our extraction and use of coal per-

manently alters landscapes and pollutes too many of our lakes and streams.

We now know that our reliance on fossil fuels was in fact more damaging than what we had realized. The concentration of carbon dioxide and other greenhouse gases in the atmosphere has been rising markedly over the course of the Industrial Age, primarily from our use of fossil fuels, to the point that the climate and weather upon which human civilization relies are dramatically changing and will change far more rapidly if we do not act.

This chart here clearly shows that something is happening. This line here is the amount of atmospheric CO2 concentration globally.

These bars show the temperatures, the mean temperatures globally. The 10 warmest years on record all occurred in the past 12 years.

We see the CO2 concentration going up at a steeper slope all the time, up to about 2000, and has gone up even more since 2000.

So we know that something drastic is happening out there and to do nothing and to ignore it is, I do not think, an option. So we have to do something.

I think the challenge ahead of us, if we are to honor our responsibility to future generations, is a challenge that we cannot sidestep. Fortunately, there are good reasons to be hopeful.

We need to drastically increase the efficiency throughout our energy economy, something that we have not done very well in the past because energy was so cheap and plentiful. We need to accelerate the transition from fossil fuels to energy derived from domestic renewable energy resources.

Now agriculture and forestry can play a central role in this energy transition and can earn economic rewards for doing so. They provide feedstocks for renewable, carbon-recycling bioenergy. Farms and ranches also provide ideal sites for wind power and solar systems. Thus, our agriculture and forestry lands are the resource basis for a new energy economy.

Farms, ranches and forests can also help curb greenhouse gases in the atmosphere. Right now, crops, trees and pastures absorb and store about 12 percent of the U.S. annual production of carbon dioxide. According to EPA, that figure could reach 20 percent through changing agronomic and forestry practices. Increasing the storage of carbon in agriculture and forestry operations can earn income for producers while reducing the economic cost of cutting greenhouse gas emissions in other industries.

Now, with good reason, we hear a lot of concern expressed about projected costs to consumers, farmers, ranchers and other businesses from proposed energy and global warming legislation. I share those concerns, and that is why I believe we must do our best to analyze costs and find the most economical, common-sense ways to achieve critically important results of energy independence and reduction of greenhouse gas emissions.

I am convinced that this energy transformation holds the key not only to economic recovery today but to major job growth and economic development for decades to come. The history of American agriculture is a history filled with stories of successfully meeting and overcoming one challenge after another. I believe that American agriculture is up to this challenge, that we can meet this, and

we can overcome it, and we can provide income and make sure that agriculture has a seat at the table and is not shunted aside in this debate on reducing greenhouse gas emissions.

Chairman HARKIN. With that, I will yield to Senator Chambliss.

STATEMENT OF HON. SAXBY CHAMBLISS, U.S. SENATOR FROM THE STATE OF GEORGIA

Senator CHAMBLISS. Mr. Chairman, thank you very much for holding this hearing today. Climate change and the energy security of our Country are two very important issues facing our Nation, and I thank our witnesses for coming forward today and letting us have a chance to dialog and presenting their ideas.

I am very concerned about the effect the House-passed American Clean Energy and Security Act and the cap and trade program it envisions will have on agriculture producers, forest landowners and residents in rural parts of the Country. No matter how you look at that bill, it appears to me it imposes costs that will far outweigh the near-term and long-term benefits. The balance between the near and long-term costs and benefits will be of foremost importance to members of this Committee. Agriculture is an energy-intensive industry and, make no mistake, the chief purpose of the Waxman-Markey and the Boxer bills is to raise the price of energy.

I say that again. The purpose of the House and Senate climate change bills is to raise the price of energy, and that is a pretty irrefutable fact.

I have asked USDA and Texas A&M University to conduct economic analyses of the bill with special attention to the effects that at the farm gate level as well as to consumers. What we have seen of these preliminary results is that no farm will escape the effect of this bill.

According to Farm Bureau—and President Stallman is here with us today, and he can confirm this, I think—that by the time this bill is fully implemented, farm income will drop $5 billion compared to the baseline. According to the National Cotton Council, cotton producers will see $300 million to $400 million in increased production cost. Rice producers will see their costs increase $80 to $150 per acre. Again, Farm Bureau estimates corn and soybean farmers will see their costs increase over $20 per acre by 2020.

With respect to cotton, our two primary competitors in the world market today are China and India, and all of us are acutely aware of the response that China and India have given recently to Secretary Clinton with respect to the proposal of their participation in the climate change issue. They basically have said go stuff it, and we are going to be putting our cotton farmers in particular at an unfair disadvantage in the world market with respect to competing with countries like India and China who are going to pay absolutely no attention to the issue.

Equally concerning is what a climate change bill will do to cropping patterns in the United States. According to the United Nations, the population of the globe will increase from 6.5 billion today to 9 billion by 2050. According to the Environmental Protection Agency, the Waxman-Markey bill will take 40 million acres of productive farm and pasture land out of production. According to USDA, total cropland in the United States totals 405 million acres.

So I find it puzzling why we want to take 10 percent of our cropland out of production when the statistics indicate that we will need every available acre of arable land to feed a hungry world.

For what? Possibly lowering global average temperatures by 0.195 degrees Celsius by 2100 if the United States is the only Country to act. This is not good policy. There has to be a better way.

Since the cap and trade program will undoubtedly raise production costs for farmers and ranchers, the offset provisions in the House bill are a key issue for agriculture and forestry, but there are still many questions to be answered. For example, if Congress creates an offsets program, there will be some producers who are able to benefit from it, but there will also be many who are not able to benefit from it.

If the greatest potential for sequestration is planting trees, how much opportunity is there for your average producers for provide offsets?

How much land is likely to be taken out of production to plant trees and let land lay fallow?

What does this mean for livestock production and food security?

Like most of my Senate colleagues, I want to support a bill that provides greater energy security for Americans and addresses climate change, but, unfortunately, the House bill is not it.

I want to support a bill that creates all kinds of jobs, not just green jobs. That bill should also reflect the realities of producing food, fiber, feed and fuel in the United States and recognize the unique aspects of rural America. I support greater energy conservation and efficiency. I support the development of nuclear energy, renewable and alternative energy sources and new drilling. We can do all of these things while addressing the environmental aspects of energy production and use.

I am ready to work with all of my colleagues who share similar goals.

Given the importance of this topic, Mr. Chairman, I ask you to consider holding more hearings on this issue. This 1,427–page bill is far too complex to address with only one hearing. For example, I expect we will find out today that we need to delve into the proposed agricultural offsets program. We will need to better understand the effects on agriculture, forestry and rural America. We will also need to carefully review the role of the Commodities Futures Trading Commission under a cap and trade program.

The potential long-lasting effects of this bill on the future of agriculture and rural America eclipses the support that we provided in the Farm Bill. We simply must have a thorough understanding before moving forward.

So, Mr. Chairman, I thank you again for holding this hearing. I look forward to hearing from our witnesses and for us to have an ongoing dialog within the ag community on this issue.

Chairman HARKIN. I thank you very much, Senator Chambliss.

Before we get to our witnesses, Senator Grassley I know wanted an opportunity to make a statement. Because he has to be involved as a Ranking Member of the Finance Committee on something called health care reform, I will just recognize him briefly.

STATEMENT OF HON. CHARLES E. GRASSLEY, U.S. SENATOR FROM THE STATE OF IOWA

Senator GRASSLEY. Yes, I thank you very much, Mr. Chairman.

I thought I ought to ask the indulgence of you, Mr. Chairman, to make a statement why I do not appear at one of the most important issues that is before the Congress that is affecting agriculture, which is this subject of cap and trade, why I cannot be here, and it is because I am negotiating on the Health Care Reform Bill with Senator Baucus along with a few other members.

I wanted to express my concern about the impact that this legislation has upon American agriculture, particularly row crop agriculture, and to say that as a Senator from the same State the Chairman is from, a leading agricultural State, and as a farmer myself, that I am very concerned about it. I am going to be very actively engaged in this through the process, and I did not want my absence from this hearing today to show maybe a lack of concern.

I share some of the thoughts that Senator Chambliss just gave, but I think on the point of the United States acting alone without some international agreement I think Administrator Lisa Jackson said it best when she said, "I believe the central part of the charts are that the U.S. action alone will not impact world CO2 levels," that this argues for doing this on an international basis and not on ourselves doing things that are going to make American agriculture or American manufacturing uncompetitive.

So I thank you very much for allowing me to speak and the indulgence of the other members as well and the witnesses, and I hope to be very involved in this in later hearings. I will submit questions for the record.

Thank you, Mr. Chairman.

Chairman HARKIN. Thank you, Senator Grassley.

Without further ado, we would like to turn to our witnesses. We have a great first panel to kick this off today. As I said earlier, at 2:30, we will reconvene with Secretary Vilsack, Administrator Jackson and Dr. John Holdren, Director of the White House Office of Science and Technology, but this morning, we have a great panel.

We have: Mr. Roger Johnson, President of the National Farmers Union; Mr. Bob Stallman, the President of the American Farm Bureau Federation; Mr. Jo Pierce, a family tree farmer from Maine representing the Forest Climate Working Group; and Mr. Jason Grumet, Founder and President of the Bipartisan Policy Center in Washington, D.C.

Gentlemen, all your statements will be made a part of the record in their entirety. I read them all last evening.

I have asked our clerk to give you 7 minutes on the clock. If you run over a minute or so, that is probably OK, but let's try to keep it to about 7 minutes.

If you could summarize your statements, I would be appreciative. We will just start with, as I read them off, Mr. Johnson, and we will work across.

So, Mr. Johnson, welcome again and please proceed.

STATEMENT OF ROGER JOHNSON, PRESIDENT, NATIONAL FARMERS UNION

Mr. JOHNSON. Thank you, Chairman Harkin, Ranking Member Chambliss and members of the Committee, for holding this hearing on this very important issue.

As the Chairman has indicated, my name is Roger Johnson. I am the President of the National Farmers Union representing about a quarter million farm and ranch families around the Country.

The American Clean Energy and Security Act of 2009, as recently passed by the House of Representatives, we believe is a step in the right direction. Chairman Peterson deserves a lot of credit for adding provisions to that Act that are favorable for agriculture and forestry, and I want to take this occasion to thank him publicly.

In order to address the issues of climate change, our policy for National Farmers Union has for some time supported a national mandatory carbon emission cap and trade system that does a number of things: grants USDA control and administration over the offsets programs, does not place an artificial cap on domestic offsets, is based upon science, recognizes and treats appropriately early actors and allows producers to stack environmental credits.

Financial implications of this issue, climate change, are significant. The cap and trade allows the market to find and deploy low-cost emission reducers—that is the way we think it ought to be structured—while mitigating increased energy costs resulting from such a program. A cap and trade system with offsets could provide farmers and ranchers the opportunity to be part of the climate change solution by utilizing soil carbon sequestration and methane capture.

The cost of no action must become a legitimate part of the ongoing debate. Models of climate change scenarios demonstrate increased frequency of heat stress, of droughts and flooding events that will reduce crop yields and livestock productivity. The risk of crop failure will increase due to rising temperatures and variable rainfall. Earlier springs seasons and warmer winter temperatures will increase pathogen and parasite survival rates, leading to disease concerns for crops and livestock. So the costs of doing nothing need to be considered in the calculation relative to this bill as well.

Further, if Congress fails to pass climate change legislation, current law would suggest that EPA needs to move to regulate greenhouse gas emissions. I do not know of anybody who thinks that would be a better alternative. A purely regulatory approach to addressing greenhouse gas emissions will bring all of the downsides with none of the upsides that carbon offsets would provide for agriculture.

The agriculture and forestry sectors should not be subject to an emissions cap as they are too small and diffuse to be directly regulated. The House bill appropriately does that.

Agriculture, as you stated, Mr. Chairman, emits approximately 7 percent of all U.S. greenhouse gas emissions but has the capacity to offset as much as 20 percent—some estimate 25 percent—of all greenhouse gas emissions from all sectors of the U.S. economy. So it is important that we figure out a way to get agriculture included in this.

Cap and trade with offsets provide a larger market, leading to lower costs for everyone in our society. In addition, offsets also provide an income opportunity to help offset some of the increased expenses that are certain to result as a result of this legislation.

On Page 3 of my testimony, I talk a bit about legislation priorities, and the question is most appropriately posed.

Chairman HARKIN. Mr. Johnson? Mr. Johnson, hold on a second. Something has happened.

Mr. JOHNSON. Are we still on here? I got a button on.

Chairman HARKIN. We blew a fuse back there. It looks like it is back on now. There you go.

Mr. JOHNSON. OK. Are we back?

All right. How should this be done? USDA has more than 20 years of targeted climate change research and is probably the premier entity in the world with respect to climate change research relative to agriculture. USDA has the institutional resources, the administrative structure and established relationships with producers to oversee the offsets program. The 2008 Farm Bill provided the Department with the statutory authority necessary to create and administer an offsets program.

A number of agencies at USDA are already working on this issue and likely will continue to ramp up their work. NRCS, CSRES, FSA, ERS and ARS are all agencies of USDA that are doing climate change work, research or work with producers.

In addition, USDA has offices located nearby to almost all farmers and ranchers in the Country.

An important issue for you to consider is to deal with the question of early actors. These are folks who have entered into voluntary legally binding contracts to reduce greenhouse gas emissions. We believe they should be allowed to participate under a Federal schedule that is adopted. We need to encourage widespread adoption of practices that reduce greenhouse gas emissions or sequester carbon, and getting these early actors appropriately accounted for, without penalizing them or adopting perverse incentives that penalize early actors, should be an important goal of this Committee.

Agriculture and forestry have the ability to provide the easiest, the least costly and the most readily available means to reduce greenhouse gas emissions on a meaningful scale, and I think all of us on this panel would argue that should a bill pass agricultural offsets need to be carefully considered by this Committee and made an integral part of the cap and trade legislation.

Allowances: We believe that the majority of the emission allowances under a cap and trade system should be auctioned off with the generated revenue used to mitigate costs and to foster the development of renewable low carbon energy sources and technologies.

Providing a percentage of overall allowances to the agricultural sector, as proposed in the earlier Lieberman-Warner climate change bill this body considered, would have a number of advantages:

It would offer flexibility for agriculture producers to implement activities that provide greenhouse gas benefits but may not technically fall within the scope of an offsets program.

It would also be a funding source for research and development that would lead to likely new offset protocols that also could be adopted and used to reduce our emissions.

It could be used to help compensate some of those folks in agriculture who are not currently likely to benefit as a result of offsets. Specialty crop producers are some that come to mind and also dealing with those pre-2001 actors who are doing the right things environmentally and need to be rewarded.

National Farmers Union believes that 5 percent of all the allowances should be provided to agriculture as this body has earlier decided should be provided to agriculture.

Skipping to the bottom of Page 5 of my testimony, dealing with renewable energy opportunities, as climate and energy legislation moves through the U.S. Senate it is critical that this opportunity is used to advance renewable energy opportunities in rural America. There are two items in particular, very briefly.

EPA should be barred from considering international indirect land use changes. This is unsettled science. The House bill did it. I would urge the Senate to follow.

Second, it is critical that legislation include a robust renewable energy standard. We have abundant wind, solar and biomass resources. We should use them.

Finally, near the bottom of Page 6, I would say also that I would encourage the Senate to look at locally owned wind projects and to provide incentives for them. They generate about 2.6 times more jobs and more than 3 times as much rural economic benefit than those that have outside ownership.

Finally, Mr. Chairman, let me say that National Farmers Union is the largest aggregator under the current Chicago Climate Exchange Carbon Reduction program. We have worked with about 5 million acres that are enrolled across more than 30 States, and nearly $9.5 million has been earned, almost 4,000 producers that are voluntarily participating in this program. We have learned some lessons that we think should be used as you design this legislation.

With that, Mr. Chairman, let me thank you for the opportunity to testify and for holding this hearing on this important issue.

[The prepared statement of Mr. Johnson can be found on page 90 in the appendix.]

Chairman HARKIN. Thank you very much, Mr. Johnson.

Now we turn to Mr. Stallman, President of the American Farm Bureau Federation. Mr. Stallman, welcome and please proceed.

STATEMENT OF BOB STALLMAN, PRESIDENT, AMERICAN FARM BUREAU FEDERATION

Mr. STALLMAN. Thank you, Mr. Chairman, Ranking Member Chambliss, members of the Committee. It is a pleasure to appear before you today on behalf of the American Farm Bureau Federation, a membership organization representing six plus million member families all across this Country. I am a rice and cattle producer from Texas, and so I am intimately familiar with the hazards that we face in the occupation of farming.

I commend you for convening this hearing today. The issue of climate change legislation is absolutely critical to American agriculture.

We are heartened by your statements, Chairman Harkin, that you want to support and even improve upon the provisions that were negotiated by Chairman Peterson and the House of Representatives. We will certainly support you and other members in that effort.

Any cap and trade bill must have the strongest, most effective, most comprehensive agricultural provisions possible. I discuss those in detail in my written statement and will be pleased to answer any questions with respect to those during the question session.

But let me stress that it is critically important to give USDA full authority over the program, full authority to ensure that conservation tillage and no-till get appropriate credit, that credits are stackable, that domestic credits get priority over international offsets, that early actors are appropriately recognized and that nutritional management plans for livestock are encouraged. In short, we want to ensure that all efforts producers undertake that mitigate greenhouse gas emissions get credit.

This is important for a simple reason: Even with the best, most comprehensive agricultural offsets program, the agricultural sector will lose under cap and trade. Under the best estimates we can make, the House-passed bill will take $5 billion out of farmers' pockets in the short term. Senator Chambliss referenced that.

The worst news is that upon full implementation we would expect that number to be $13 billion out of farmers' pockets, and it is likely that he costs could be very much higher.

In addition, we have the potential for acreage shifts, which we experience in agriculture, but the structure of the Waxman-Markey bill and the energy expenses would tend to indicate that soybeans will have a preference because of less inputs like fertilizer and energy costs.

We also have the very real risk, if carbon offset prices are high enough, of having cropland shifted into forestry.

One thing that is not often recognized is that landowners are often not the farmers. There are many tenant farmers in this Country. Most of the acreage in this Country is farmed under leases from landowners, and those landowners may have a great incentive to put that cropland into forestry at the expense of the farmers who are currently farming that ground.

But, truthfully, any figure I or anyone else gives you is really not much more than an educated guess. There are so many unknowns and assumptions and estimates that are built into this debate. No one can look you in the face and tell you with certainty what is going to happen.

One thing, however, does seems certain. You are not going to make a meaningful difference in what the climate will be 40 years from now.

Mr. Chairman, your chart certainly showed the trends in temperature and carbon concentrations, but the reality is under the IPCC models the Waxman-Markey legislation will not alter that

trend. Administrator Jackson of EPA testified to that fact just 2 weeks ago. Others have said as much.

Bjorn Lomborg, the Danish environmentalist and author who has written a great deal on this topic, said: "At a cost of hundreds of billions of dollars annually, Waxman-Markey will have virtually no impact on climate change. If all of the bill's many provisions were entirely fulfilled, economic models show that it would reduce the temperature by the end of the century by 0.11 degree centigrade, reducing warming by less than 4 percent.

"Even if every Kyoto-obligated country passed its own duplicate Waxman-Markey bills, which is implausible and would incur significantly higher costs, the global reduction would amount to just 0.22 degree centigrade by the end of the century.

"The reduction in global temperature would not be measurable in 100 years, yet the cost would be significant and payable now."

Mr. Chairman, I hope you and all the members of the Committee take those words to heart.

Today, the United States has more recoverable coal reserves than any other country, over 263 billion short tons. Waxman-Markey requires us to ration that resource.

China has 126 billion short tons in coal reserves. Russia has 173 billion short tons, and you can add to Russia's energy resources 60 billion barrels of oil, 3 times what we have in the United States. Waxman-Markey puts no limit at all on how those nations use their natural resources.

Here is the kicker. If you examine this issue from a truly environmental perspective, the United States produces more product per ton of emission than those other countries. We are more efficient users of energy. The argument that China and India are using, that per capita carbon emissions should be the standard with which to negotiate an international agreement, is flawed. I would think we would want to have a system that rewarded productivity and energy use.

Waxman-Markey penalizes the best environmental steward in terms of the U.S. and does nothing to tackle the real problem. We strongly urge Congress to reject such an approach.

I hear from farmers all over the Country who are following this debate, and they keep asking me: Why are they doing this? Frankly, I do not have an answer.

As Mr. Lomborg points out, coal-fired power plants being build today in India and China have the potential to lift a billion people out of poverty. I think we can all agree that is probably a good thing. But we do not have to reduce the American standard of living at the same time, and we should not. Make no mistake, Waxman-Markey puts a huge economic burden on American citizens.

This issue is at a critical juncture. It is imperative that this Committee formulate the strongest agricultural offsets program possible, but we also strongly urge all members of the Committee to work with your colleagues to make the right policy choices. If those choices cannot be made, then you should reject the overall bill, just as a strong bipartisan group did in the House.

We hope this Committee will mark up your own provisions to be incorporated in any bill and conduct further hearings if you think it is advisable. If you take the time to evaluate this issue honestly,

fairly and objectively, we have no doubt you will craft a much better bill than the one passed by the House of Representatives.

Never forget a few simple facts: If you want to change the climate in 40 or 100 years, this bill will not do it. If you want the U.S. to compete internationally, this is not the answer. If you want to make the U.S. energy independent, this is not the solution.

Thank you again for the invitation to testify, and I look forward to answering questions.

[The prepared statement of Mr. Stallman can be found on page 106 in the appendix.]

Chairman HARKIN. Thank you very much, Mr. Stallman.

Now we will turn to Mr. Jo Pierce on behalf of the American Forest Foundation. Mr. Pierce.

STATEMENT OF JO PIERCE, FAMILY TREE FARMER ON BEHALF OF THE FOREST CLIMATE WORKING GROUP

Mr. PIERCE. Thank you, Chairman Harkin, Ranking Member Chambliss, Senators, for the opportunity to come talk with you today.

America's forests have a lot to offer when it comes to addressing climate change. Right now, according to the EPA, U.S. forests sequester and store 10 percent of our annual emissions. EPA estimates can double this number, supplying 20 percent of the Nation's climate solution from our forests.

This is a solution here in our own backyards. All we need to do is to encourage sustainable forest management. I want to be clear, we are not looking for people to plant trees on farmland. The problem is too many landowners who do not manage their land the way my family does, and we have to bring them along to do sustainable forestry.

Forest offsets are a key cost saver in cap and trade. EPA's analysis of the House bill showed reliance on U.S. forest offsets for over 80 percent of domestic offsets. With such heavy reliance on forest offsets, forests are key to keeping the costs of a cap and trade system low. Including a strong role for forests in a cap and trade system will also provide thousands of new green jobs in rural communities, putting people to work harvesting the carbon in our forests.

It is not just forest owners like me that agree about the strong role of forests in climate solutions. The Forest Climate Working Group, a diverse coalition of groups from the Hardwood Federation to the National Wildlife Federation, all support a strong role for forests in climate legislation. We will submit into the record a letter from this diverse group later in the day.

To secure this climate benefit, climate legislation must engage the broad range of owners of U.S. forests. Most people think U.S. forests are owned by the Feds or big industry, but this is far from reality. In fact, over 10 million private forest owners in America own most of the Nation's forests. Most of these owners are families just like me. I am a sixth generation family forest owner managing my land for income, wildlife and other community amenities like clean water and recreational opportunities.

Why not for carbon sequestration too?

Unfortunately, with declining timber markets and increased development pressures, we are losing forest land. I get four or five offers for my land every year.

Climate legislation can set up new income streams for forest owners to help them hang onto their land while providing climate benefit. To fully capture the estimated 20 percent of the Nation's climate solution from our own forested backyards and engage the 10 million owners of U.S. private forests, climate legislation must put the right incentives and market structures in place.

So what are key elements of climate legislation that will engage the Nation's private forest owners in climate mitigation activities?

First, the legislation should establish environmentally sound offset markets that are flexible enough to engage a broad range of forest owners. Specifically, the legislation must: Specify forest project types, allowing offset projects from improvement of forest management activities with appropriate crediting for harvested wood products, not just tree planting. Provide flexible contracting options for landowners who may or may not be able to commit to a very long-term contract as required in many other offset markets right now. Reward early actors who have already taken steps to combat climate change. Provide a role for the USDA in offset markets.

The House-passed bill contained improvements on some of these issues, but more can be done.

Second, legislation should provide forest carbon incentives that capture climate mitigation benefits from forests that do not fit in the carbon offset markets. This is especially important for smaller forest owners who are not likely to participate in offset markets because the up- front investment is not likely to be recovered on small forest tracts. Interestingly, these smaller owners hold one-quarter of the private forest land base. So these types of incentives are critical to fully tap the climate mitigation potential from private forests.

Unfortunately, these incentives were not provided in the House-passed bill even though an amendment was offered to create them.

Third, the legislation should provide resources for forest adaptation activities to ensure that the climate mitigation tool we have in our forest backyard is not overtaken with impacts from climate change like drought, fires, pathogens and pests.

The House-passed bill is an improvement, but more can be done.

The bottom line is the U.S. forests have a lot to offer, and we should not miss the opportunity to deal with climate change while also setting up incentives and markets to keep families like me on the land and keeping it forests.

Chairman HARKIN. Thank you very much, Mr. Pierce.

Now we will finish our testimonies with Mr. Jason Grumet. Do I pronounce it Grumet or Grumette?

Mr. GRUMET. Senator, shockingly, you did pronounce it correctly. It is Grumet. Thank you.

[The prepared statement of Mr. Pierce can be found on page 100 in the appendix.]

Chairman HARKIN. Yes, we have good staff working. All right, Mr. Jason Grumet, President of the Bipartisan Policy Center.

STATEMENT OF JASON GRUMET, FOUNDER AND PRESIDENT, BIPARTISAN POLICY CENTER

Mr. GRUMET. Well, good morning, Chairman Harkin, Ranking Member Chambliss and the Committee.

As you note, I am Jason Grumet. I am the President of the Bipartisan Policy Center. On behalf of our founders, your former colleagues, Tom Daschle, Bob Dole, George Mitchell and Howard Baker, it is a pleasure to appear before the Committee today.

Also I want a special thanks to go to Mr. Chambliss for the high protein breakfast snack that we all enjoy. We appreciate that very much.

Mr. Chairman, the Bipartisan Policy Center was created to provide both the motivation and the infrastructure for the kind of principled compromise that you all well know is necessary for the kind of durable policy change that we need in this Country. Toward that end, we have projects underway on health care and national security, regulatory reform and transportation policy, but we have two projects that bear directly on the inquiry here today.

The first is a project that was begun in 2001 called the National Commission on Energy Policy. This effort has brought together a diverse group of energy experts, chaired by former EPA Administrator Bill Reilly, John Rowe, who is the Chairman and CEO of the Exelon Corporation, and, until recently, by John Holdren, who you will be hearing from later today.

Consistent with the way that you framed the challenge in your opening remarks, we see the goal as trying to figure out how we address the challenges of climate change consistent with our longer-term national security and economic goals. And, in particular, we focus on mechanisms to address, I think, many of the very real concerns that Mr. Stallman has raised: How do you ensure that you can address climate change in a meaningful and sincere way without having excessive volatility in prices or excessive impacts on the economy? I will draw from some of our thinking in a moment.

The second project is a project that Senators Daschle and Dole have led personally. This is the 21st Century Agriculture Policy Project. They have been working together for several years. They have produced two reports which have been submitted to the record previously, but as we are down to our last 18,000 copies I have brought a few more for your enjoyment. These reports really focused, first, broadly on the questions of what are new opportunities for agriculture in new competing markets.

They held a series of hearings around the Country. They conducted and sponsored a series of analysis, some by Dr. McCarl from Texas A&M, who I know you are also working with. In the conclusion of Dr. McCarl, the sense was that a well-designed market that took advantage of all these opportunities could in fact provide net benefits for the agriculture community.

On the basis of that and their analysis, and I will quote, Senators Daschle and Dole concluded in the first study that "Federal action to establish a mandatory program to limit greenhouse gas emissions is sensible and will provide agricultural producers with significant new market opportunities."

They continue that "The agriculture sector is in a unique position to lead and benefit from efforts to address climate change."

The second study focused on taking that theoretical possibility and figuring out how, in practice, to capture the real opportunities to provide a new economic impetus for American farming and forestry through carbon sequestration activities.

I think the prior witnesses have done an excellent job of framing the risks and opportunities that we have, and I think the principal point I want to share with you is that it is really up to you. You can design a carbon mitigation strategy that mitigates the costs and takes advantage of those opportunities in a way that is going to be very good for American farming and forestry. But it is equally true that a poorly designed program that does not address the risks of high cost and price volatility and does not capture the very significant opportunities for agriculture will harm the industry.

I think it is important to move away from this kind of binary culture war of is climate change going to be good or bad for American farming. The answer is it depends, and I think we have the opportunities now that I would like to reflect upon to chart that productive course.

So, first of all, I want to embrace Mr. Stallman's challenge, that we have to think seriously about the potential for price volatility and the costs borne by agriculture and all energy-intensive industries. This Committee, like those before, has always faced the challenge of having sensible experts who reach wildly different views on the costs of climate change control, and that comes from the fact that you can put together a number of reasonable optimistic or reasonable pessimistic assumptions on the progress on technology, on future prices for natural gas, on the availability of offsets and reach wildly different conclusions.

This has been going on for quite some time. In the 1990's, the Council of Economic Advisers concluded that we could achieve compliance with Kyoto for between $14 and $23 a ton, but the Department of Energy thought it would be $95 a ton.

We have the challenge of people coming forward and basically having the kind of my modeler is smarter than your modeler fight. Ultimately, of course, we do not know.

It is important, I think, to have mechanisms that do not rely on the magic words, "trust me", because there is simply not enough trust in this debate, and the stakes are too high to gamble our future on one side or the other being right.

The good news is those mechanisms exist. Our Energy Commission proposed many years ago the idea of a cost cap in the early years of the climate program, called the safety valve, in which the government would provide credits at a fixed price to people who had a compliance obligations. By setting that fixed price, you could provide a meaningful absolute cap on the total cost of the program.

This idea has matured over the years, and in the Warner-Lieberman legislation and in the recent House bill the idea of a credit reserve, which I am happy to talk about in more detail, is something that we have helped develop and support. This would take credits from the future and put them in a transparent vat that you could go access if in fact it turns out the technology is not proceeding at the pace that we hoped.

Either of these mechanisms provide the opportunity for predictable and transparent cost containment, which we do believe is going to be necessary to build a meaningful bipartisan consensus.

I will note that there are a few other mechanisms that the House bill and prior Senate bills have take advantage of. First of all, as I think Mr. Chambliss points out, farming is an energy-intensive industry. As Senator Stabenow and others have spent a great deal of time focusing on how we address the transition for energy-intensive industries, one good opportunity is to provide free permits for a period of time so that companies have the resources to invest and modernize and become more efficient. I think the House made a smart choice in including key aspects of the agriculture sector in that energy-intensive category—fertilizer manufacturing, wet milling and others—and we commend you to look at those ideas.

Then, finally, issues of market design are important, and, Chairman Harkin, I know this is a concern of yours. The words, market-based program, are not quite the selling point that they used to be in proposing new policy ideas since the financial collapse.

One of the benefits of cost containment, having both a price floor and a price ceiling, is that you reduce the market volatility. Consumers do not like volatile prices. One group that does like volatile prices is Wall Street. That is where, if there is going to be mischief, that mischief can come from—arbitraging the highs and the peaks and the valleys and the lows.

If you have a cost collar, both a cost floor and a cost cap, you can dramatically reduce that concern and, importantly, do so without coming up with overly prescriptive regulations that could actually seize the market and stop it from functioning at all. We think you do need to be careful not to try to be overly prescriptive in regulating the market. Having a cost cap for the first several years, we think, is a good opportunity.

Let me turn now in the limited time I have left to the good news, to the opportunities to capitalize on the significant ability of agriculture and forestry to help solve this problem.

The House debate focused greatly on which agency should have the lead, and we commend and applaud Chairman Peterson's efforts to demonstrate the important role that the agriculture community and the USDA should play in leading this program. Senators Dole and Daschle focused less on which agency should have the lead and more on what is a program design that would encourage the kind of collaboration and discourage the conflict that we have seen from time to time between environmental and ag advocates and between USDA and USEPA.

I want to very much reinforce Mr. Johnson's suggestion that we take a two-track approach. Senators Daschle and Dole believe that we should have unlimited access to domestic farm offsets for projects that can be demonstrated to meet the rigorous measurement, permanence and additionality requirements, but they also recognize that not all programs are going to fit easily into that set of ideas, and there is a real concern that the high level of scrutiny could slow down the market in a way that we cannot tolerate.

So they propose, I think similar to Mr. Johnson, that we have a second track where we encourage more innovation and more experimentation, and we do so by insuring the program with emis-

sion credits. Rather than giving those credits to somebody to emit, you hold those credits aside and you use these allowances to essentially provide insurance against more innovative and creative projects—projects that are more complicated because there are early action issues that create concern over baseline, projects in which they are brand new and we need to learn our way through that system.

Just like we provide bonus allowances to encourage carbon sequestration, just like we support the need for loan guarantees for nuclear power, we need to have an opportunity to be experimental. It is in that spirit that we are confident that the ag and the environmental communities will work well together.

The offsets program in its most rigorous form is an all or nothing proposition. It forces EPA to focus on the 5 percent that is imperfect and not the 95 percent that is perfect. So having this alternative mechanism, we think, will enable much greater collaboration.

So, in closing, I just want to make two points. First, absent purpose-designed climate legislation, the government will have no choice but to use the existing statutes that you have all passed, that being the Clean Air Act. As Mr. Johnson points out rightly, that obligates EPA to focus on the glass being half empty. It obligates them to focus their considerable regulatory authority in traditional command and control regulation, and they do not have the ability to enable the ag and forestry communities to capitalize on the significant opportunities through sequestration.

Finally, this Committee has a proud history of bipartisanship and putting the interests of agriculture ahead of party interests. I will note that despite the tremendous themes and theories of Purple Nation and bipartisanship in the campaign, when I tell people these days that I run something called the Bipartisan Policy Center, they tend to smile and say, good luck with that.

We need more than good luck. We need real leadership, and this is the Committee, I think, that can bring the debate back to focus on the real substantive challenges and design a program that is truly going to be in the best interest of American agriculture and forestry. I look forward to the opportunity to be able to work with you in that regard.

Thank you.

[The prepared statement of Mr. Grumet can be found on page 74 in the appendix.]

Chairman HARKIN. Thank you very much, Mr. Grumet, and thank you all for good testimonies, not only verbally but your written testimonies.

We will start now rounds of 7–minute questions, and, if we can get the clock reset here, I will start.

First of all, I will start with Mr. Johnson.

The Farmers Union Carbon Credit Program allows producers to earn income by reducing greenhouse gas emissions through no-till, anaerobic manure digester systems, tree plantings and other sustainable management techniques. It is my understanding that carbon sequestration methods can be implemented with conventional farming techniques so that the agriculture community can provide carbon offsets in a cost-effective manner while acquiring new rev-

enue. So I think it is not a matter of deciding to grow carbon or crops. Producers can be growing both crops at once on the same land.

Could you elaborate on the opportunities that a global warming bill could bring to farmers? How large was your effort and how many farmers have participated? What does the trend look like? Are farmers able to adopt these practices? Those are kind of the questions I want to get into on your carbon credit program.

What would happen to your program? How might it accelerate if in fact we did in fact have a cap? Right now, there is no cap. I do not know how much your farmers are making, but with a cap, obviously, those offsets become more valuable.

Mr. JOHNSON. Well, thank you, Mr. Chairman.

On Page 7, near the top of my testimony, I give you some of the numbers: about 5 million acres that have been enrolled, 30—I think the latest number is closer to 40—States, about $9.5 million, about 4,000 producers.

But the crux of your question really gets to what are the opportunities and is there a difference between the voluntary program that we operate now and a mandatory program that would exist under a cap? Let me take those in two pieces—first of all, the kinds of things that would and should be eligible.

First of all, we have no-till practices. There are lots of science that says you follow no-till practices, especially in certain areas of the Country, you clearly sequester carbon and store it underground in the root structure at variable rates. And so, under the program, there is a larger credit that is given to a farmer in one part of the Country versus another part of the Country because the science says that that is the way it ought to be.

Precision farming is one of those that we have not yet had approved through the CCX. This voluntary market has only been operational for about 3 years. In 2006 is when we entered it. So it has not been around all that long.

But, under precision farming, one of the very deleterious greenhouse gas emissions that exists is nitrous oxide. It is like 300 times more potent than carbon dioxide. So, by certain kinds of fertilizer practices that reduce those gaseous emissions of that nitrogen going into the air, you can clearly reduce greenhouse gas emissions.

No we have not advanced the protocols yet to the point where we are actually giving folks credit for that, but certainly that is a good example of the kinds of R&D that ought to be funded so that we in fact could figure out a way to appropriately compensate folks for that, if not under offsets then under the allowance pool that we have been talking about as well. So there are lots of those kinds of examples.

Now, as to your question about what is the market likely to look like in a voluntary versus a mandatory system, I think the average price that our folks have received has probably been in that three to four, maybe five dollars a ton range. Today, it is well under a dollar a ton for two reasons. The economy collapsed, No. 1. No. 2, all the uncertainty that is generated by these debates in Congress right now lead people to wonder whether what they are signing up for today will be eligible under a system going forward, and so that has a severe market-depressing impact.

Pretty clearly, under a mandatory system, that uncertainty would go away once you have a bill that is passed and you know what the rules. Most models suggest that the value of a ton of carbon would go up significantly under a mandatory system.

Today, the value is determined mostly out of the graciousness of some large companies, both national and international companies and that are voluntarily purchasing these carbon reductions in order to have a clean, green image to the press or maybe they have got some attendant obligations under Kyoto because they are a multinational company. Maybe they just want to do kind of the right thing environmentally. Maybe it is part of their marketing program. But, whatever it is, it is different reasons for different companies, and it is voluntary. So, as their income goes down, you know the likelihood of them investing in these voluntary things goes down with it as well.

Chairman HARKIN. First of all, I just want to say at the outset to everyone here that this whole debate, I guess if you want to call, about whether or not early actors as we now call them—I get all kinds of new phrases coming down here—will be folded into the system. I can assure you they will be. I have spent too many years on this Committee and in the House committee watching programs come up that require a farmer to tear up conservation practices in order to redo them to qualify.

Mr. JOHNSON. Exactly, exactly.

Chairman HARKIN. It ain't going to happen. OK?

Mr. JOHNSON. Good.

Chairman HARKIN. There are very few things I can guarantee but on that one, we are going to make sure.

Mr. JOHNSON. All right.

Chairman HARKIN. We did that in the conservation stewardship programs, saying that if you were doing these practices you were eligible for it just as much as anyone else. So I want to make that very clear, and I think we will find probably a pretty good consensus here on this Committee and in the Senate for that.

The other thing, does it makes sense right now for your farmers to adopt some of these practices, economic sense, Mr. Johnson? You are talking about a dollar a ton?

Mr. JOHNSON. Yes. At that price, certainly, that is not at a high enough level to sort of induce people to do something that they otherwise would not do, and that is one of the fundamental precepts of an option, by the way, of the various protocols that are involved. It is the principle of additionality. You want folks to do something that they would not otherwise do in the absence of that offset opportunity. So that is something that we are really struggling with, with the market as low as it is right.

But, over the last weekend, I met with a dairy farmer in southern Virginia who is very seriously looking at putting in a methane digester, a fairly sizable dairy producer. Well, it is not economical today. I mean you just cannot make it work just on dollars and cents.

He wants to do it for all the right reasons. He likes the environmental impacts. He is in an area where he has got a lot of neighbors. They would appreciate the fact that the odor problem largely disappears with methane digesters. If you have a significant value

that can be attached to the reduction of that methane, the destruction of that methane by burning it, that is probably enough to tip a number of folks over into adopting those kinds of practices that have a multiplicity of benefits for the environment.

Chairman HARKIN. Well, thank you.

I, obviously, have questions for other panelists. I will have to wait until my second round. Now I will turn to Senator Chambliss.

Senator CHAMBLISS. Thank you, Mr. Chairman.

Mr. STALLMAN AND MR. Johnson, both of you represent large producers from different parts of the Country, but the testimony of the two of you differs substantially on the costs, the benefits and the other likely impacts of the House bill on production agriculture. I would like for both of you to comment on that.

What is the reason for this difference, Mr. Johnson?

Mr. JOHNSON. Well, you know I think it is important, Senator Chambliss, that maybe we talk about where we agree. You know Mr. Stallman can certainly have a chance to respond to this after I do, but I think on pretty much all the kinds of things, if you listen closely to my testimony and to his testimony and the testimony of the other witnesses, these kinds of things relative to agriculture, if they are folded into a bill, these are all things that we agree on.

Where our fundamental disagreement lies is whether we ought to pass a bill like this or not.

You know I can only speak for myself and for my members. Our policies are adopted by all of our members as they come together in the national convention, and we have had this policy for a number of years. It has been longstanding policy.

I would say a couple of things. First of all, we take seriously this threat that EPA may at some point, under existing law, go out and try to regulate what is going on in agriculture. We do not like that idea very much.

Under the Clean Air Act, you now have a Supreme Court decision that basically compels them to do it. You have an endangerment finding that fits into that. You have a regulatory threshold under the bills that are being contemplated that is a thousand times larger than the regulatory threshold under the Clean Air Act.

That is why farmers, most farmers and ranchers are excluded under the cap and trade legislation. They are provided these optional opportunities. Under EPA, that may be that we may be required to do a whole bunch of things. And so, we take that very seriously.

We also think that we believe the science. I mean the science seems compelling. It says climate change is happening, mankind is having an impact on it, and we need to do something about that. Now whether it is all this bill or something else, you know there is a lot of room for us to come together on different parts of it. We think something needs to be done, and we want to be helpful in that debate, and we would be delighted to work with you.

Chairman HARKIN. OK. Mr. Stallman?

Mr. STALLMAN. Senator, with respect to our economic analysis, we were trying to figure out some common set of numbers or assumptions to use, and so we used the EPA's analysis of the Waxman-Markey bill which we view as a very rosy scenario in terms

of impact on energy costs. That is what gave us our $5 billion reduction in net farm income and up to $13 billion reduction in net farm income. So our economics team used that as the basis for trying to analyze the impact on agriculture.

Once again, you can pick other assumptions. You can pick higher energy costs, which we feel are more likely than not given the EPA's assumptions about the Waxman-Markey bill and how fast things like nuclear and solar and wind-generated electricity will come online, and come up with much worse numbers.

We do disagree with my colleague here relative to a couple of issues. One is we are focusing on the Waxman-Markey bill and what the impacts of that are going to be. Once again, that bill, even by proponents of the global warming crowd, will do little or nothing to address this problem. And so, then our question becomes why are we burdening the U.S. economy with a bill that admittedly will not do anything to address the problem that it is purported to address? So that is one area that we disagree with pretty substantially.

On the EPA regulation issue, currently, under the endangerment finding in the Massachusetts case, EPA has the obligation to regulate basically auto emissions. All of the rest of their proposed regulation is very speculative.

I find it very difficult to believe that this Congress would give them the amount of resources necessary to come out on a farm by farm basis and regulate agriculture. It may happen. I am not saying it cannot happen, but that would be so burdensome and onerous. I think there would be an outcry that this Congress would address. So I am not as concerned about that as my colleague sitting next to me is.

Those are some of the fundamental differences that we think, but it really comes back to looking at the specifics of the Waxman-Markey bill and trying to determine what those impacts will be, not only on agriculture but on America in general.

Senator CHAMBLISS. And, again, I assume this is not Bob Stallman's opinion. It is the opinion of your membership in some sort of formalized way.

Mr. STALLMAN. Well, absolutely, Senator Chambliss. I did not talk about our decisionmaking process, but we actually start out at the county level with proposals that go up to a State level meeting and then ultimately to our national meeting, all decided upon by our delegates that are there representing their respective members at each level. It is a very democratic, grassroots process, and it allows for a lot of debate. In fact, it allows for about 5 months worth of debate every year on these issues, and that is how we derive our policy positions.

Senator CHAMBLISS. Mr. Johnson, I can appreciate the willingness of your members to want to address climate change. However, in your testimony, you do not address the cost aspects of the House bill and a cap and trade program. Yet, these costs are likely to be significant for producers in every rural part of America.

Has NFU done an analysis of those costs and what do you think about the other studies that have been done that are going to project these high costs on your membership?

Mr. JOHNSON. Senator Chambliss, we are concerned about the costs. We are convinced that there will be some increased costs to producers. Energy costs are going to go up. I do not think there is much debate about that. As a result, you are likely to see fertilizer prices, particularly nitrogen fertilizer prices, go up. So you are going to see costs go up.

We have not done our own independent studies. Lots of studies have been done, as you know. Mr. Stallman talked about their in-house study. Ohio State just did and released a study. The FAPRI released a study. Most of these have been considerably lower than what the Farm Bureau study result has been.

All of these have not included the costs of doing nothing, and that is a real challenge that I think all of us have. We do not have the resources to do that, but I hope that this Committee will figure out, will try to sort out is there a methodology to quantify these additional costs to risk management, to insurance companies, to disaster payments that Congress is likely to authorize as a result of the increased flooding and droughts and fires and pestilence—those sorts of things that pretty much the body of scientific evidence suggests is the outcome that we are likely to see more and more of in increasing amounts as global change continues to happen.

Those are difficult things to get your arms around, and so we do not have an internal study that we have looked at, but there are have been a lot of studies out there. I think the FAPRI study basically said the cost to the average person is like 50 cents or something like that. There was another study that says it is going to be less than $5 an acre on average, much higher for some crops, lower for others. So they are kind of all over the board.

Senator CHAMBLISS. Mr. Pierce, quickly, you talked about a small forest landowner not really being able to participate in the House-passed design. What are we talking about with a small forest? Are you talking about 50 acres, 100 acres, 200? What range are you looking at there?

Mr. PIERCE. We are talking about 100 acres or less. It just does not pay to do all the auditing and the setting up of a carbon sequestration program.

Senator CHAMBLISS. OK. Thank you, Mr. Chairman.

Chairman HARKIN. Thank you, Senator Chambliss.

I might just add that I just received this morning a preliminary analysis of the effects of H.R. 2454 on U.S. agriculture from the Office of the Chief Economist at USDA. It was just delivered this morning. I think this would be a good point just to read the executive summary.

They said that USDA performed a preliminary economic analysis of the impact of the House-passed bill. The analysis assumes no technological change, no alteration of inputs in agriculture and no increase in demand for bioenergy as a result of higher energy prices. Therefore, the study overestimates the impact of the climate legislation on agricultural costs in the short, 2012–2018, medium, 2027–2033, and long term, 2042–2048.

In USDA's analysis, short-term costs remain low in part because of provisions in H.R. 2454 that reduce the impacts of the bill on fertilizer costs. In fact, the impact on net farm income is less than

a 1 percent decrease. In the short run, agriculture offset markets may cover these costs. Over the medium term and long term, cost to agriculture rise but remain modest, 3.5 percent and 7.2 percent decreases in net farm income respectively over the medium and long term.

However, benefits to agriculture from an offsets market rise over time and will likely overtake costs in the medium and long term.

Other studies that account for the impact of higher energy prices on input substitution and demand for bioenergy find that H.R. 2454 leads to higher agricultural incomes even without offsets.

In summary, USDA's analysis showed that the agricultural sector will have modest costs in the short term and net benefits, perhaps significant net benefits, over the long term.

Their table that they had here showed that the effects in the short term from 2012 to 2018: Total expenses, 0.7 billion; fertilizer and lime, less than 0.1. So the total of fuel, oil and electricity is about 0.7. So about seven-tenths of a percent increase in farm expenses from the 2012 to 2018 timeframe.

So this is USDA's analysis. I am sure you will be reading about it today, but I thought this would be the appropriate place to mention that we just got that to the Committee today.

Now, in order of arrival, Senator Johanns, Senator Lugar, Senator Stabenow, Senator Roberts, Senator Klobuchar, Senator Lincoln. So I will recognize Senator Johanns.

Senator JOHANNS. Mr. Chairman, let me start by just expressing my appreciation not only to the witnesses but to the Chairman for calling this important hearing. I do appreciate it.

Mr. Johnson, let me start with you. The legislation is so complex that I could probably spend 2 hours with each witness, and we do not have 2 hours. We have 7 minutes in the first round at least.

But I was struck by the fact that one of the things you said at the start of your testimony was that Waxman-Markey was a step in the right direction, and I want to drill down a little bit deeper on that. One of the things that I understand about Waxman-Markey is that it does not help out the early good actors. Is that your understanding also?

Mr. JOHNSON. Senator Johanns, I think Waxman-Markey could be improved by this Committee significantly on the question of early actors, and that is really one of the things. They just did a tiny something, like a quarter of a percent of the allowance allocation. That is one of the reasons why we have asked for a 5 percent of the allowances to go to USDA to figure out how to appropriately deal with early actors.

The early actor question is a really difficult question because the purists—and I do not mean that pejoratively—when dealing with offsets, will argue that you should not pay someone for doing something that they would have done anyway. If you do, you are violating this principle of additionality.

But most of us who live in the real world would say, well, the last thing you want to do is to incent someone to plow up no-till so you can redo no-till or to take land out of CRP so you can put it back into permanent grass.

To deal with those things, there are a couple of ways you do it. You either bend that definition of additionality. What we would

argue is you use a baseline, and the House did that, of 2001. For practices beginning after 2001, going forward, they are eligible. That bends that definition a little bit. But, beyond that, you need to provide another pool of resources so that you can put policies in place that do not provide these sorts of perverse incentives.

Senator JOHANNS. To date, there is a real deficiency here. It is not only in the legislation, but it is also in what USDA is saying. USDA, in testimony before EPW, says "To ensure that carbon offsets result in real atmospheric benefits, carbon offsets must be additional. That is carbon offset credit must not be awarded for actions that have happened in the absence of the offsets policy."

So, at least to date, this Waxman-Markey bill is a very serious problem for agriculture. Would you agree with that?

Mr. JOHNSON. Well, no, I do not know that I would.

First of all, what I would agree with is that definition that you just read from the Secretary, I think, very accurately summarizes the principle of additionality that proponents of offsets insist upon being met.

Senator JOHANNS. That very well summarizes the position of the USDA.

Mr. JOHNSON. Well, you will have to ask the Secretary. I am sure you will later today. But I suspect that it does. It is on the record. And, it is for that very reason that you need another pool of money to deal with these early actors.

To get to the premise of your question initially, it was about my statement that the bill was a step in the right direction. There is a lot of things sort of built into that summary statement, if you will.

One of the things that I think and I hope will happen in the Senate is that you will have the benefit of looking at the language well in advance of having to make decisions and will have the ability to make lots of adjustments that many of us, as we were involved in testifying on the House side, we just simply did not have that advantage. Language arrived late. It is sort of the nature of the process. I understand that.

But, hopefully, the best news I heard out of this was announcements by your Chairman and other chairmen over here saying that they intend to use the language of the House as a starting point. I think that is wise because it is complicated language. Undoubtedly, there is lots of room for improvement.

Senator JOHANNS. What other areas, as you have now had a chance to review and analyze the bill, would you say we should reject, pay attention to? What other deficiencies do you see in Waxman-Markey?

Mr. JOHNSON. If you will look at my testimony beginning on Page 3 and through Page 5, I summarize, and, again, the focus that we have taken here is on the agricultural and forestry offsets. I summarize a number of the principles that we think are very important.

We think in the case of early actors they did not go far enough. We have already talked about that.

On the question of unlimited domestic offsets, they have a limit that is imposed. In fact, this is another area where I think Mr. Stallman and I would agree. We think there ought not be a limit

there, and we think you ought to devise a system that gives preference to domestic as opposed to international offsets.

We think while there was some language in there trying to deal with this, the international trade issue, that is an enormous for us. If we go down this path and major emitters like China and India do not, then we are at a significant competitive disadvantage. You need to have some provision, whether it is through the use of tariffs or something, that will sort of level that playing field, if you will. And, it would probably need to be country by country because much of the rest of the world were signatories to Kyoto, and so they are embarking on something not identical but probably similar to what we are talking about here.

Senator JOHANNS. Let me stop you there, Mr. Johnson.

Mr. JOHNSON. OK.

Senator JOHANNS. What if we do have a tariff system on China? China has basically said: We are not going to agree to caps. Take a hike.

So, if we have a tariff system on China's goods, whatever the goods are we want to put a tariff on or some kind of trade barrier or whatever, what do we do when China says, we do not want your soybeans?

Mr. JOHNSON. Well, you know you raise a really good point, and the point is about the integration of our policies with respect not only to this legislation but with respect to our negotiating positions at the WTO and those sorts of things as well. You need to. That is something that we do not have a lot of expertise in. We just think that that is something that you need to deal with.

My guess is that what China is saying and what India is saying is going to be muted and defused as the years go by, in fact, as the months go by, leading up to the big conference in Copenhagen in December. Some of this is probably positioning. Some of this is making sure that different countries have the moral authority to stand up and argue one way or another way.

It would be my hope that what happens, depending upon where this legislation is in this Country, that our Administration will go to Copenhagen and argue with as much passion as possible that the rest of the countries of the world need to be joining in this fight because a ton of greenhouse gas emissions, whether it comes from the U.S. or China, has the same impact.

Senator JOHANNS. Let me wrap up because I am out of time, but I will say this. With many years of experience in dealing with them, they are not positioning. Ask our pork producers. Ask them about poultry. They are not positioning. On the last day, China will look out for China.

Chairman HARKIN. Thank you very much, Senator Johanns.

Senator Lugar.

Senator LUGAR. Well, thank you, Mr. Chairman.

Let me just say at the outset that when asked by the press whether I would have voted for Waxman-Markey if I had been in the House, my answer is no. Now this does not mean that I am opposed to our Committee writing a bill, and I look forward to working with the Chairman and the distinguished Ranking Member. But we have just touched upon one reason why we really have a danger zone, and I understand the problems of dealing with

China and India and the fact that they are not very cooperative but there is already a little bit of a protectionist tendency in our governmental policies perhaps because of the recession, loss of jobs and so forth. It is sort of an easy throw to gain support for something that really ought not to be in the trade area.

In addition, I would hope that even though persons were pleased that you could pass any bill on cap and trade or climate change and therefore exult really in the legislative success, I am not convinced that the impact upon CO2 or greenhouse gases is very substantial even over the long run of this, in part because so many compromises had to be made to draw one person after another across the line. So it is there, but maybe we better really try again.

It is in that spirit that I listen carefully today, and I appreciate some thoughts that have arisen from this panel, one of which was that ag emits maybe 7 percent of the problem but could contain 25 percent under certain circumstances . That is truly remarkable. If American agriculture alone is able on a net basis to take care of 18 percent of the problem, that is a good bit more, I think, than the whole Waxman-Markey bill will be finally evaluated as. So we ought to listen carefully as to how that is going to occur.

Now one of the ways that it occurs is, for instance, through the early actors guarantee that you have talked about, Mr. Johnson, and you have talked about, Mr. Pierce.

Let me just admit that I have been intrigued by this issue for a while. As Chairman of the Foreign Relations Committee, we had hearings in 2005 and 2006, and you participated in one of those, Mr. Grumet. We appreciated that.

Clear back when I was Chairman of the Agriculture Committee, in 2000, we had a hearing on this issue, a long time ago. One of the things that came from that was Chicago Climate Exchange testimony, and on one occasion I was asked by Mr. Sandor to become a client or a partner or what have you of the Exchange. So people came out to my farm and measured trees that had just been planted.

Now here we have, of course, the problem of the early actor business. We have hundreds of acres of trees that had been planted, but they are off the reservation. Nonetheless, they were measured, and so I have been an active participant and looking at the web site of CCX almost every day. It is only about 55 cents a ton. Now I have had some good days. It was $7 a ton back 2 or 3 years ago. It even got to four during the last climate change debate with Warner-Lieberman or what have you.

So I have been appreciative of the National Farmers Union group coming for celebrations here, with the tree people and the no-till planting people, with the Farmers Union aggregated farmers.

There are forestry groups now I am pleased to see, and you might comment about this, Mr. Pierce, that are prepared to do some aggregation of forest owners, the small people, the people that might not ever get the measurements or will get into an argument over early actors or all the rest of it.

In other words, in order for ag to come into play, we really have to begin to think through the rules of the game so that people can participate. So I am storing tons of carbon in the trees that have been planted. I get a reading each year from CCX, and I am much

interested in this. A lot of farmers in Indiana are too but feel cheated of the opportunity really to get in, in this respect.

Now let me finally mention I think since a third of my farm is also in trees, a third in corn, a third in soybeans, I am interested in the fertilizer problem. You have touched upon this today, and we want to follow that very closely because this is a cost factor obviously for anybody who is in that business.

But, at the end of the day, this could be a very constructive Committee because we may be able to solve a good part of whatever the climate change problem is without arguing the cosmic issues of whether there is a big problem, a small problem, one now or here, and do constructive things.

I just want to ask you, Mr. Pierce, for an additional bit of testimony. How would you go about, in the early actor business, of using either of our two great farm organizations if they were to aggregate people? And, maybe that is not a good idea, but how do we get forest owners, all these hundreds of thousands and what have you that you have mentioned into the ball game?

Mr. PIERCE. Well, the American Forest Foundation has two pilot programs right now which are trading carbon credits on the CCX. So there is aggregation going on.

We need to have any program administered and the rules written by the USDA. They are the people we trust. As one-third of your farm is in trees, it is more like 95 percent of my farm. But I still farm about 35 acres, and I deal with USDA. You know they are down the street, so to speak.

We need flexibility. We need flexibility as to areas of the Country being treated differently. There are different practices that would sequester carbon in different areas of the Country.

We need flexibility in length of contract because family forest owners want to have a length of contract that is comfortable for them. I have heard of very long contracts that would go beyond my lifetime. I cannot commit to what my son's practice will be.

Yes, we need to reward the early actors. I practice, I think, the best forestry that can be practiced in Maine, and I do not think I should be left out of the program.

Senator LUGAR. My time is about concluded, but let me just add one sort of editorial comment. A mention has been made because frequently it is sort of dragged into this, that, by golly, if we do not act, why heaven help us because EPA will come into this and EPA with the Supreme Court ruling will take care of this.

No, I think no one of us—there are 100 Senators—can set the law. But I would just say I believe I could get a majority of Senators to repeal whatever is in the EPA act to eliminate EPA out of this picture—the audacious idea that somehow or other we have to be pressed into this kind of legislation because somebody at EPA finds that things are askance. I am outraged by the measurements of corn ethanol being done by EPA using extraneous events, and the House bill tried to meet that, and I appreciate that fact. But it is outrageous.

So I would just say that we would have another debate in another committee perhaps, dealing with EPA, but we ought to be dealing with agriculture in a very straightforward way.

I thank you, Mr. Chairman, for giving us this opportunity.

Chairman HARKIN. Well, thank you, Senator Lugar. I remember when you started these hearings back when you were Chairman of this Committee. So you have always kind of been in the forefront of this sort of effort, not only on agriculture but on foreign relations, and I look forward to working with you and tapping into your expertise on how we as an agriculture committee move forward on this.

As you know, I guess we made some kind of a tentative agreement. I do not know if it is tentative or actual, but we made an agreement that by September 28th that we would submit to the EPW our recommendations. So, hopefully, our staff and your staff can work together on this, with other members of the Committee of course.

Now, Senator Stabenow.

Senator STABENOW. Well, thank you very much, Mr. Chairman, for your leadership and welcome to all of the members that have joined us from very important perspectives and organizations.

Let me just start by saying that it has been a pleasure to work with the Chairman, your staff and others in the last year since the subcommittee that I chair held a hearing on offsets when the previous bill was up before consideration. At that time, I began to really focus and understand how important an offsets program is and how important it is that agriculture be participating as part of the solution and benefit from anything that is done as it relates to a new clean energy policy. And so, everyone who has been involved in working with us and all the staff, we very much appreciate that.

One of the things that struck out to me at the time was, and the numbers can vary a little, but EPA has said that 20 percent of the greenhouse gas emissions in the U.S. can be sequestered in agriculture and forest lands. And so, whether that is 15, whether that is 20, whether that is 25, I think that is very significant and is something that certainly I know we as a Committee want to make sure happens from a positive standpoint.

All of us struggle around the cost issues. Whether I am here with my agriculture hat or I am in other committees focused on manufacturing, my goal and I know other goals of colleagues is to make sure this is a net winner, not a loser, and it has to be in terms of the economy moving forward.

I am struck, though, by a couple of studies, and the Chairman just talked about the USDA analysis. But Iowa State, and I would like for the record to say I graduated from Michigan State, Mr. Chairman, but Iowa State has suggested that the cost of corn will increase $4.52 per acre but with offsets the benefits would be $8 an acre. So that is what we want to have happen. If that in fact is accurate, that is the direction we want to go in.

Also, Texas A&M agriculture researchers said that there could be a net profit benefit, a net increase in profits of as much as 24 percent after taking in consideration of additional costs.

So, Mr. Chairman, I know that our goal is to make sure those numbers are the numbers that happen and that we are not in a situation where agriculture is hurt by this policy.

I have a lot of questions, but, Mr. Grumet, let me start with you first. I think it is important to ask a question just in general. We

have heard a lot about the Waxman-Markey legislation and whether or not it will make a difference in climate change. I mean does that bill make a difference? Is it worth building on that?

Mr. GRUMET. Well, Senator Stabenow, I think it is fair to understand that action of the House and action that the Senate could take is going to be heroically important to the global process. I think Administrator Jackson's quote has been referred to a few different times, that U.S. action alone is not going to make a significant ecological difference in global temperature, and that is, I think, so profoundly obvious it is not clear to me why people think it is a gotcha point.

We live in a global commons, and the question we have to ask ourselves is what role do we see the United States playing in that arrangement? Unilateral action by the United States will not solve terrorism. It will not solve world hunger. It will not prevent nuclear proliferation, and it will not prevent climate change because these are collective action problems.

In 1992, the first President Bush went to the Rio Accords and identified, I think, the right answer which is the notion of differentiated commitments, that the U.S. has an obligation and an opportunity to lead but that we should not be chumps. We should not take steps three, four and five without recognizing that the rest of the world is going to have to come with us.

So, the challenge for us is to design a program which, as you point out, capitalizes on the incredible opportunities for agriculture. The opportunities are in fact bigger than the risks. So, if we capture those opportunities, we put together a program which is good for U.S. agriculture on its merits, but it brings us back into a very different position in the global arrangement.

Dr. Holdren will be with you later today. He has come back from China recently. I would encourage you to ask his ideas about this.

But, again, the situation is much more complex than I think some would like us to believe. I have not heard China say, we do not care about climate change and we never plan to be part of that solution.

The Chinese are nothing if not practical. They have four times the population that we have on two thirds of the arable land and much less ability to manage the hydro flows from the snow melt than we do. They recognize that they are in very significant jeopardy from the impacts on climate change.

They also are terrific in appreciating markets. As their major clients in Europe and the United States, as major consumers like Wal-Mart and others start to identify sustainability standards, the markets for these products are going to shift, and the Chinese pay very close attention to that.

The Chinese recognize that they are in a more insecure position vis-a-vis oil dependence than we are in the United States, and they recognize that, just as we do, the vast majority of actions that we take to address our greenhouse gas emissions will also diversify our energy supply and make us and them more secure.

They recognize that modernization—the point that Senator Johanns and others made earlier, that to have a more efficient economy you produce more goods for less carbon—is also consonant with their long-term interests. So they have passed vehicle fuel

economy standards which are more aggressive than we have. They have energy efficiency and renewables programs that are more aggressive than we have.

I do not want to imply that it is going to be easy to convince the Chinese to come with us; it is clear that this is a great problem. We are a great Nation, and great nations take steps to solve those great problems. I believe if we do lead we can count on the Chinese to follow.

Senator STABENOW. Thank you. I want to get in one other quick question. I do want to say, though, that enforcing those, it is great to have it on paper with China, but we have to make sure that that is enforced if it is going to work.

Regarding early actors and one of the things that we have been working on in language is not only an offsets program but what I think is really important, which is a USDA incentive and support program so that there would be set aside allowances from the cap that would relate to USDA activity, to help both fund early actors who have built up carbon stockpiles and fund emission reduction projects and for those that are looking for new opportunities.

There are some areas, certainly of agriculture currently now, that would net benefit from this. And, how do we make sure that we do research and development and have new opportunities that maybe are not currently available made available for certain sections of agriculture?

My question, I guess I would address it to you as I close the first round: Does it matter at this point, as it relates to early actors, whether we are rewarding them through the offsets program or through an allowance set-aside program at this point?

Mr. GRUMET. Thank you, Senator.

I think it does matter, and I commend you for your efforts there and also will acknowledge that your conclusions are very consistent with the conclusions that Senators Dole and Daschle reached on our behalf.

The traditional offsets approach is, by design, a very rigid approach. You are either 100 percent right or you are flawed. On issues such as early action and additionality, it draws out these kind of philosophical questions about what would have happened otherwise, and it does create, as a number of panelists have mentioned, some tricky perverse incentives.

If you try to, and I will use a technical term, "jam" those ideas into a traditional offsets program, you run a real risk of diminishing the credibility and integrity of that program. And so, one of the concerns that we have, one of the necessities of having this alternative pathway is not to undermine the public confidence in the traditional offsets program because there are a host of activities—flaring, capturing and flaring methane and other programs—which are easy to discern, to measure, and those can move through the system quickly, and they should be unlimited.

But we do need to have this creative space where we can be a little bit more innovative and a little bit more experimental, where we can look at the glass being half full more than half empty. Taking credits and having a set-aside program to do that, I think, will enable us to have the learning to get the momentum behind this program that we need. I think we have a real concern that absent

that program we will not realize the full potential as quickly as we need to.

The last point I will make is that it is within that program that I think there is tremendous opportunity for real collaboration between EPA and USDA. Where we are going to have fights is over that last 5 percent, and I think that will really undermine the spirit of this entire enterprise.

The idea of a kind of a separate but equal offsets program with EPA having its own program and USDA having its own program is not likely to create the kind of cordial comity and shared interests that we are ultimately going to need. I think that reinforces the divisiveness, and I think that would be a problem in the long term for the agricultural offsets program.

Senator STABENOW. Thank you, Mr. Chairman.

Chairman HARKIN. Thank you, Senator Stabenow.

Senator Roberts.

Senator ROBERTS. Thank you, Mr. Chairman, and I especially want to thank you for holding these hearings. I know we are going to have a second round. I know we are going to have testimony from the Administration, both EPA and the USDA this afternoon, and that is a very good thing.

I would urge you, sir, and I am going to plead with you to have more hearings on this bill. I think Senator Lugar made a very good point. We can be part of the answer, not part of the challenge, in trying to take the best aspects of this bill if that can be done. I have some concern about that, but we will have to do it with hearings like this. This is the first hearing, and I certainly commend you for it and look forward to the hearings this afternoon.

I would just like to tell my colleagues and anybody else interested that some years ago, several years after the Senate voted 97 to nothing against joining the Kyoto agreement mainly because other countries were not taking part and we thought it would harm the U.S. economy, we went to Antarctica on a CODEL. Senator Stevens led the effort because he had such a strong interest in it.

During that particular visit, you can actually look at the ice corridors. Some people call them ice holes. But there is 9,000 feet of ice there until you hit ground, and you can determine. It is like rings in a tree, Mr. Chairman, where you can actually see there has been global warming. Now whether it is temporary, whether it is an aberration or whatever, that is still to be decided.

But, basically, the decision was to come back and see if we could not be on the positive side of this, more especially in regards to agriculture. I know I met with Secretary Glickman who was a good friend from Kansas. We even had a press conference down on the Mall where finally I told the Washington Post that carbon in the air, bad, carbon in the soil, good, and that is what carbon sequestration meant.

I know all of you here certainly understand that. So I would hope we could have additional hearings.

Mr. Johnson, I agree with you that the USDA must be very aggressive to take this jurisdiction, to take the lead. I am sure Mr. Stallman agrees with that.

I am not making this up, but we have had reports of the EPA and some people in the EPA of resurrecting the old problem of

rural fugitive dust which came along in the 1970's. They recommended we have water trucks going out at 10 in the morning and 2 in the afternoon to get this dust down.

I am not making this up. There is even a proposal to study the ramification of changing the genes in cattle, so you have cattle half size, half-size cattle. So I guess if you head them up and move them out, you will have twice as many, but you will still have a lot of dust and will still have a lot of problems.

Now I am being a little sarcastic, but things like that do happen with the EPA, and we need to keep it in the USDA's jurisdiction.

I would like to associate myself with the remarks of Senator Chambliss who I think made a very good point, Senator Grassley who talked earlier, certainly the Chairman and certainly Mr. Stallman. It is good to see you back in the saddle. We have a tremendous challenge on our hands, and all of our farm organizations including the Farmers Union.

Mr. Chairman, I think the USDA has to have more resources. We have people working on the Farm Bill, people working on trying to finalize the software that does not exist for the permanent disaster program, and they are working with pencils and, thankfully, they have erasers.

Here we are now going to come in and need to implement this tremendous program and see what cropping practices are viable, what cropping practices make sense, what cropping practices are eligible, and then the great question of whether we mandate this or not. So I really look forward to this, and I think that the Ag Committee under your very capable leadership, sir, can play a big part.

Mr. Stallman, in your testimony, you highlight the potential conflicts of the proposed cap and trade scheme and our trade obligations, and we have talked about that. If passed, would the United States be more vulnerable to challenges before the WTO? That answer to me is yes.

If so, is it possible that the very countries that are major contributors of global greenhouse gases would initiate these challenges? And, I am talking about China.

Mr. STALLMAN. We believe they would. In fact, India has already said as much. China has already talked about what border tariff barriers would mean to them and how they dislike them. We expect a full range of challenges of those kind of border measures that are included in Waxman-Markey and may be further included here in the Senate.

You know what we have done is have the bill in the form of Waxman-Markey that puts energy costs on this Country and this Country alone. That makes us less competitive. And then, we try to flip around and figure out how to protect our industries, the trade in the international market. It is like we are trying to do two wrongs to make a right, and it is just we do not believe it is going to work.

Senator ROBERTS. Thank you for that answer. I think it is a very common-sense answer and very candid.

I do not see the value of putting a tariff on any Chinese product. My word, former Chairman Greenspan, talked before one of our conferences and indicated he thought we were at a tipping point with the economy. By that, he meant China would not buy our

bonds, our paper, and then interest rates would go up to the point that it would make it more attractive.

If you put a tariff on China, Senator Smoot and Senator Hawley might vote for it, but I think that is very dangerous.

Mr. Johnson, your testimony states that carbon credit income potential is significant for your members.

The effects of this bill worry me that while all producers will have to pay more for input costs, not all producers will receive any offsetting income since not all producers can go to a no-till operation or plant trees or afford two to three million dollars for a digester. So my question to you is will not this bill create winners and losers among your members? That is the thing we have to determine in this Committee.

What regional or crop-specific analysis has the Farmers Union done to determine which producers win and which producers lose?

Mr. Stallman, you can answer that question too.

Mr. JOHNSON. Well, Senator Roberts, thanks for the question.

As I indicated earlier, we have not done a separate analysis. We have looked at a lot of the analyses that others have done.

Clearly, I mean any time you pass legislation, you create winners and losers. I do not think there is any other way to look at it. I mean there will be some farmers who will be in a very strong position. They will have the opportunity to do lots of offset income, and there will be others that will have minimal opportunity, so will face increased costs. I really do not think there is much debate about that.

I would suggest that maybe the best way to look at that is to dig into the bowels of the economic think tanks, the USDA study that apparently was just released and try and figure out who those winners and losers are. That is one of the reasons why we argue that you need to set aside a chunk of these allowances so that if you need to design a practice to compensate some of the losers you can do that with those monies, without making them overburdened.

Finally, this question about China is a real intriguing question. Fundamentally, it is why many of us have argued in the trade arena that we need to have environmental standards and labor standards and others, those kinds of things negotiated as part of the trade agreement.

I think we would all agree that it is not fair competition to have one country producing things and externalizing a lot of the costs of production by dumping them on the rest of either their society or, in the case of greenhouse gases, the world while other countries follow the rules and have higher costs. So that, I mean this is a more a trade issue than it is a greenhouse gas issue.

Senator ROBERTS. Well, pardon the interruption. My time has run out.

Mr. Stallman, do you have any other comment real quickly?

Mr. STALLMAN. Quickly, on that particularly, in terms of international negotiations including labor and environment, I cannot wait until we have the EU standards imposed on us as a Country because that is what we are talking about if you are talk about international standards. So we would oppose that approach.

Offsets, the price that farmers get, as that price goes up for those offsets, a limited group of farmers, that also means the cost of energy is going up for all farmers.

Senator ROBERTS. I have never quite understood why we cannot settle the labor or try to settle the labor problems that are challenges we have with other countries, more especially China, with the International Labor Organization, the ILO, rather than putting in some kind of trade agreement. The chances of China accepting a trade agreement by us dictating certain standards for their labor decisions are slim and none, and slim left town.

Chairman HARKIN. Thank you very much. Thank you, Senator Roberts.

Senator Klobuchar.

Senator KLOBUCHAR. Thank you very much, Chairman Harkin, and thank you to our distinguished witnesses for being here.

I want to first of all say that I would agree with the Chairman that we need to make some additional changes to this bill.

Agriculture is incredibly important to my State, the fifth in the Country. We are the No. 3 hog producer, a major producer of corn and soybeans, wheat, sugar beets and, of course, No. 1 in turkeys. So a lot of my focus in this area has been jobs in the ag area and energy jobs and introducing renewable energy standards that include waste energy and allow our farmers to have a piece of the action, and I actually think that has benefited in our State.

As you know, Mr. Johnson and Mr. Stallman, that we have a gross renewable energy standard, but we also have a very aggressive biofuels program. I think part of why some of these energy issues have been more bipartisan in our State is that people feel that they have a piece of the action, that they are going to profit from some of these energy jobs, that it is not just about people on Wall Street or somewhere else. So that is why I appreciated all of your comments here.

I first wanted to start with the ethanol blend issue, that this is a possibility that we could do this with this bill. I see homegrown biofuels as a piece in a lot of the future here. I think that the way to do it may be with higher blend amounts to go up to, say, 15 percent, and I do not see why we could not do this as part of this bill. I think it has been taking too long at the EPA. I also see our growth into cellulosic ethanol is a much bigger way that we can produce ethanol.

But I wondered, Mr. Johnson, Mr. Stallman, if you could comment on that.

Mr. JOHNSON. We would certainly support that.

Senator KLOBUCHAR. OK. Mr. Stallman?

Mr. STALLMAN. As would we.

Senator KLOBUCHAR. All right, very good. Thank you for going on, so I can now go to my next question on that.

Mr. Johnson, you talked about making the case for allocating some of the allowances. What criteria do you suggest using to determine eligibility for those allowances?

Mr. JOHNSON. Well, that is a really good question, Senator Klobuchar, and I think it is helpful to think of this in the context of offsets. OK?

We heard earlier testimony about the importance of maintaining the integrity of offsets. While I agree with that, I would also want your Committee to think very closely about how you distribute the revenues. OK?

Our view is that under this bill USDA should be put in charge of the offsets program. They should the empanel the scientific experts who establish the protocols. And then, they should have their delivery agencies, the ones that are close to the farmers and ranchers, that are out there verifying and monitoring and perhaps auditing to make sure that the rules are being followed.

But, as far as the distribution of money, they do not need to be involved in that with offsets. That can be handled through the marketplace just like the CCX is doing it right now. Aggregators do it, I would argue, much, much more efficiently.

Now that does not sound like it answers your question, but the problem is this: When you try to mirror offsets with these allowances and run them through USDA, I think you need to think creatively about whether there is not a methodology that would allow you to get those payments that are made through the market system as opposed to having these folks with pencils and erasers having to write out checks now too.

We are real concerned about adding to the bureaucracy at USDA. It is overstretched. It is strained. It is under enormous pressure. So we want to minimize that to the degree that we can.

It is a long way of answering your question, but, fundamentally, we want these allowance dollars to be used for a number of things. To deal with the early actors, that gets to all the stuff I have said about offsets. OK? So, as closely as you can mirror what the offset market is, that is what you want to do with the early actors, using these allowances dollars for the folks that do not technically qualify for an offset. OK?

We want you to use these dollars for R&D. We think there is tremendous opportunity through new technologies to demonstrate that agriculture will significantly reduce the emissions, but we need to research and develop it and establish with scientific certainty, to the degree that those two words go together, that in fact what we are doing makes sense so that you can roll these new things onto the options market and provide new income opportunities as well. So, R&D is really critically important.

Of course, anything that provides a perverse incentive to do the kinds of things that the Chairman has worked for most of his career to avoid, any of those kinds of things that are identified in this process, hopefully, you create some sort of a mechanism to eliminate them.

Senator KLOBUCHAR. OK. I assume by your comments and Mr. Stallman as well, just knowing your previous views on this, that, paperwork or not, you both would rather have the USDA doing this rather than the EPA with the agricultural offsets?

Mr. STALLMAN. Absolutely, no question, USDA is well positioned to handle this. Much better positioned than the EPA, I might add. I would associate myself with the remarks my colleague has made about what we need to have USDA be able to do to be sure that we have an adequate offsets program.

Senator KLOBUCHAR. OK. Thank you very much.

Mr. Pierce, part of this new energy potential is biomass from logging. Do you want to comment on that when we look at renewable standards and making sure that we include that as a piece of this?

Mr. PIERCE. Well, I certainly hope that. Speaking as a tree farmer, I certainly hope that we do include biomass. It is very important to support the low end of the market in order to have good forestry done.

Senator KLOBUCHAR. OK, very good. Thank you to our panel. I really appreciate your answers.

I am looking forward to working with the Chairman and with my good friend, Collin Peterson, who worked hard to make some improvements to this bill. He just left me a message about a totally unrelated matter, but I will continue to work with him.

Thank you.

Chairman HARKIN. Thank you very much, Senator Klobuchar.

Senator Lincoln.

Senator LINCOLN. Thank you, Mr. Chairman, and thanks to you and Senator Chambliss for holding the hearing today, getting us started on this.

We all recognize that cap and trade would really touch nearly every aspect of our lives, and that is especially true for agriculture. We discussed at great length that there is potential for landowners to benefit by tapping new revenue streams, through implementing practices that reduce greenhouse gas emissions.

But it is also very, very likely that farmers will face higher costs for input like fertilizer and fuel, and it certainly poses a challenge, I think, for Arkansas producers that farm capital-intensive crops like cotton and rice. Our poultry, livestock and dairy producers could also grapple with those increases in energy costs, but they too could potentially take advantage of some of these programs we are talking about.

The purpose of these hearings and future hearings, I hope, is really to flesh out the costs and the benefits of a cap and trade bill for agriculture and explore how the Senate can improve upon what the House has done.

What is so badly needed in this debate is more detailed economic analysis on a crop-by-crop, industry-by-industry and regional basis. I do understand from the pieces you presented us today, Mr. Chairman, the preliminary analysis that has been provided by USDA this morning does provide us some of that analysis.

But I do believe we need to take a broader look at how it will impact obviously our producers but also impact food prices. I hope that we will look for all of that information. It is going to require delving into how the House bill is going to impact the food processing industry, which includes sectors like poultry, meat, and oil seed processing. I just hope, as Senator Roberts mentioned, that the Chairman will consider holding more hearings to be able to look at that, and we certainly appreciate your leadership and all of what you have been doing here.

Just three quick questions, and I think I will throw them out there and let you all answer them as you may.

We have talked a lot about early action and credits for early action. Some of you all have mentioned flexibility and the need for

that flexibility. I do not want to assume what you are saying from that. I hope it is, but I am not going to assume it.

We also know that there is flexibility through different types of programs that are recognized.

In the House bill, there is some confusing language about early actors and their offsets, whether they will count unless they are registered with an exchange that is recognized under State law. As I said, I do not want to assume anything, but I hope it is that we are looking that, for us, most of our producers and our foresters are going to be out of luck under that House bill because the programs they use, like Senator Lugar, the CCX, would not qualify.

I am assuming that we are hoping that when you say flexibility you mean that multiple programs will be acceptable as opposed to those that are just registered under States. But, again, I do not want to assume anything. So I hope that you all will touch on that.

Mr. Pierce, in terms of the strategy to address climate change and how it has been shifting to increasing use of renewable energy. Biomass, forest biomass in the production of electricity and fuels is, I think, critical. Do you think that the House-passed bill fully captures the potential use of forest biomass from private forests?

Of course, private and public forests are treated completely or pretty differently in the House bill, and I would like you comments on that.

Then last, Mr. Grumet, one of the concerns I am hearing from constituents is the fear that a cap and trade scheme would create yet another market where there is opportunity for mischief. I am hoping that you can elaborate on how the Bipartisan Policy Center believes Congress could be most effective in ensuring transparency in the cap and trade market.

I noticed in your testimony that you quoted limiting "the risk that credit-trading will lead to the enrichment of Wall Street at the expense of Main Street." We have been there. We have done that. We do not want to go there again.

So I would love your comments on either of those three.

Mr. JOHNSON. Well, I will start and be very brief because I have talked a fair amount. As to the question relative to offsets and flexibility, we would certainly agree with the assumption that you stated as you asked the question.

We do not necessarily think that the only early actors that ought to be compensated are those that have already enrolled in the CCX program. In fact, we would disagree with that. We have argued that you ought to use a baseline of 2001. There are lots of reasons you can pick that year. It is arbitrary, I understand. Then any changes that have happened since then would be presumed to be additional.

Senator LINCOLN. Any changes since 2001?

Mr. JOHNSON. Yes. That has been the position that many of us in a number of different ag groups have sort of settled on that. There are reasons for it. I mean that is the Kyoto thing was happening, the Farm Bill. There are lots of things that lined up that suggested that that is a date.

Right after that date, the CCX was formed. It was sort of formed in anticipation of a law passing, and so you can say: Well, let's figure out how to not penalize those guys. Let's reward them.

Mr. GRUMET. Senator, I can just pick up on that, unless you want to go in order.

Senator LINCOLN. No. That is fine.

Mr. GRUMET. The duel track approach, this is really the same question that Senator Klobuchar and others were asking, and how we bring flexibility into the system. Then, just again, focus on the fact that the traditional offset approach is a brittle approach, and it needs to be because if there were flaws in the system we would be adding more pollution to the atmosphere than we would be reducing.

The need to have this alternative use of allowances, to provide kind of insurance for that, provides a tremendous amount of flexibility across the line here. It allows people to be a little bit more innovative, a little bit more creative and a little bit more risk-taking. That is true for early action because you have a ton as an insurance policy against those approaches. It is true for flexibility and diversity in program choices.

What I would hope the USDA would say when they visited the Lugar Farm is: Great work on those black chestnuts, Senator. Those are measurable, and we have a protocol, and those just go. We do not have to touch them. The marketplace is going to decide that.

But you know you are also doing this interesting job, doing some no-till farming and some nutrient management, and this is a very creative idea. It is a little harder to figure out. You can go two ways. You can either hunker down with USDA and spend a bit of time and money really sharpening your pencils and trying to prove the value of your work or we have this other alternative, a place where you can come do more kind of creative programs because essentially there is an insurance policy behind them.

USDA could essentially provide credits that would otherwise turn into emissions elsewhere to Senator Lugar and his family for their good work.

I wonder if you have looked at the price of your credits before and after this hearing to see what kind of impact we have had on the marketplace today.

But it does seem to me that that kind of flexibility is significant and important to get this program up and running so that we do not spend our time biting our nails and gritting our teeth on the tiny details.

While I have the mic, just on this very important and complicated question of market oversight, it is certainly true that coming to visit folks like you and saying: Senator, do I have a deal for you? We would like to create a new $200 billion commodity. Not to worry, the good people in New York City are going to figure it out—is not as popular an opening statement as it might have been a couple of years ago.

At the same time, it is critically important that we have a functioning market, and there are really two options here. The one that we believe is the right one is to think about the carbon commodity as part of the overall struggle we are now having to bring more transparency to derivatives at large. There is really no difference ultimately between what we do here with carbon and what we do with other financial products.

Rather than trying to put a little bit of an obstacle in every possible pathway for nefarious action, we think if you have good cost containment, if you have a price floor and a price ceiling that limits the volatility, it allows you to exhale a little bit. It dramatically reduces the possibility of that enrichment so that we can learn our way into this market with low risk. It is essentially a set of training wheels on the program.

I fear if we go the other direction and try to pin down every possible problem we will stifle the market to such an extent that we will not have investment in these clean technologies.

So I do not think people see cost containment traditionally as a benefit to this kind of market oversight, but I think one of the best advantages you get is you reduce the volatility which consumers hate, elected officials hate and Wall Street sometimes enjoys.

Senator LINCOLN. You are saying a cap and a floor as opposed to just a cap.

Mr. GRUMET. A cap and a floor, a price collar.

Senator LINCOLN. Oh, just a floor, OK.

Mr. STALLMAN. Senator, if I could still have a little additional time to respond, we would support maximum flexibility for the early actors.

But let me get down to the point that Mr. Grumet made earlier about mitigating the negative impacts about implementation of a carbon market. One way to do that which has not been discussed, since that carbon market is going to be driven by the cost of energy, is to have an off-ramp in the legislation in case the renewable low carbon fuels and generation of electricity through nuclear, solar or wind do not come online as quickly as the predictions have indicated, to point out some of the rosy scenarios in terms of the Waxman-Markey bill.

There should be an off-ramp provision where if those sources do not come online as quickly as project, then we should string out or mitigate the implementation of the carbon reductions—so, kind of have a trigger, if you will, to keep everyone honest in terms of projections about what will ultimately happen under the Waxman-Markey bill.

Chairman HARKIN. Thank you. We are in a vote now, and the second bells have rung on our vote.

I think it is clear this has been a good panel. I appreciate all the testimony.

It is clear that we are probably going to have to have some more hearings on this. I will begin consulting with other members of the Committee on that.

As I said, this afternoon, we will have the Administration witnesses.

I thought I just might conclude with what Mr. Grumet said in his closing. He said, "While we can all agree that U.S. action alone cannot solve a global problem, it is equally true that we have no hope of securing effective and equitable global action absent U.S. leadership." I think that really is the key.

Now we have this meeting in Copenhagen in December. The President would like to have us pass some legislation prior to that time. I understand on the Senate floor we were asked to give our

input by September 28th. That is why we will probably have some more hearings on this. But we do have to provide that leadership.

But, taking off on what Mr. Stallman just said, I have often thought of an off-ramp, not the off-ramp that you described in terms of what happens if we do not get the technologies, but if we put in place a good cap and trade system that incorporates agriculture, gives adequate offsets and allowances to agriculture, and we go to Copenhagen and we start down this road, if other countries do not join us, if India and China and all these other countries we hear about do not join in on this effort, then we have an off-ramp. That is the off-ramp I am thinking of.

We provide the leadership. We say this is what we are going to do. We are going to be very aggressive in this, in the United States. We are going to push as hard as we can for clean renewable energy resources, but we want other countries to come in. If you do not, well, we are off the highway.

With that, the Committee will stand adjourned.

Oh, excuse me. I am sorry.

Senator CHAMBLISS. Let's leave the record open. I have some other questions, and other members may have to.

Chairman HARKIN. Good suggestion. Oh, thank you. Thank you, Senator Chambliss.

We will leave the record open for other comments and testimony or other comments from members of the Committee and also if we have some written questions that we would like to maybe submit to you. I did not ask all my questions in either. Perhaps, we would like to do that.

We do look forward to your engagement in this process as we move ahead over the next couple or 3 months.

Thank you very much. We will resume our sitting at 2:30 here in this room.

[Whereupon, at 12:11 p.m., the Committee recessed and reconvened at 2:36 p.m.]

Chairman HARKIN. The Senate Committee on Agriculture, Nutrition and Forestry will resume its sitting from this morning, and we had a great discussion this morning. We had a good panel this morning and a good discussion, a lot of pertinent questions.

This afternoon, we are honored to have three distinguished individuals, all of whom I think have a lot of expertise in this area. That is the area of agriculture and the environment, climate change and how it is going to impact agriculture and the role that agriculture can play both in reducing greenhouse gas emissions but also the role it can play in offsets, in carbon sequestration.

So we are continuing our hearing today, and we are honored to have the Secretary of Agriculture, Secretary Tom Vilsack, who was sworn as the 30th Secretary of the U.S. Department of Agriculture this year. Appointed by President Barack Obama, he received unanimous support for his confirmation by both this Committee and the entire U.S. Senate.

Secretary Vilsack has served in the public sector at nearly every level of government. When I first met him, he was the Mayor of Mount Pleasant, Iowa, in 1987 and then as a State Senator in the Iowa Senate, and then in 1998 he was the first Democrat elected

Governor of Iowa in more than 30 years, an office he held for 2 terms.

As Secretary of Agriculture, Secretary Vilsack has been candid and direct about the challenges and opportunities facing farmers and ranchers across America and the importance of fulfilling the vast missions as a champion of rural America and as a steward of the environment. So we are honored to have him here.

Also, we have EPA Administrator Lisa Jackson, again nominated to lead the Agency by President Obama and confirmed by the Senate in January. Administrator Jackson lists among her priorities: reducing greenhouse gas emissions, improving air quality, managing chemical risk and cleaning up hazardous waste sites and protecting America's water.

Before becoming EPA's Administrator, Administrator Jackson served as Chief of Staff to New Jersey Governor Jon S. Corzine, a former member of the U.S. Senate. Prior to that, she was appointed by Governor Corzine to be Commissioner of the State's Department of Environmental Protection in 2006.

We have Dr. John Holdren, Assistant to the President for Science and Technology and Director of the White House Office of Science and Technology Policy. Prior to joining the Administration, Dr. Holdren was the Teresa and John Heinz Professor of Environmental Policy and Director of the Program on Science, Technology and Public Policy at Harvard University's Kennedy School of Government as well as a professor in Harvard's Department of Earth and Planetary Sciences and Director of the Woods Hole Research Center.

Well, we are honored to have you here.

This morning, we had a good discussion. I will point out, I will just bring up the chart that I started my comments with this morning on, one, we have to do something.

But this chart basically just shows we have to do something. This goes back to 1880, and it shows the global temperatures here and what has happened. We know that the 10 warmest years on record occurred in the past 12 years. People always say, well, gee, I had a cool summer. Well, those little odds and ends happen. The fact is no one can deny that the Earth is heating up at a rapid pace.

Also, the concentration of CO2 corresponds directly with that, and it is going up at an ever increasing rate.

So to do nothing is not an option, and there are some concerns about the role of the United States and whether we should do it. And. what about other countries? What about China? What about India? What about Brazil? What about the European Union?

We cannot do it all by ourselves. We cannot really bend that curve down if only we do it, but other countries have to be involved also. And so, that is, I think, one of the challenges facing us. How do we provide that leadership but then how do we get other countries onboard also to help us?

That is sort of the big picture, but the picture we are concerned with here is the role of agriculture, our farmers and ranchers in this country and how we are going to be involved, how they are going to be involved in this process.

The House has passed its bill. This Committee will be holding other hearings on this, and we will be involved with the Environ-

ment and Public Works Committee in the Senate beginning at the end of September and into October and probably November in fashioning a bill. I know the President wants something out of Congress before the Copenhagen meetings in December, and we will do our darnedest to try to meet that deadline, and the goal of the President is to get something done.

But we want to know, what is the role of agriculture? What is going to happen to farmers and ranchers? We hear a lot of estimates on cost, how much the costs are going to go up.

Secretary Vilsack, I know, will talk about this. We just got the analysis from your Department this morning that is a little bit different than what we have been hearing out there.

Then, what role we can play in the environment and with EPA in agriculture and how we can work together both to meet the goals of decreasing our greenhouse gas emissions but also becoming more energy independent in this country—we have those two goals. And, what is the role of agriculture?

With that, I would recognize my good friend and our distinguished Secretary of Agriculture. Thank you again for being here.

All of your written testimonies will be made a part of the record in their entirety. If you could sum it up in seven or eight, 9 minutes, something like that, I would appreciate it. We will start with Secretary Vilsack, go to Administrator Jackson and then Dr. Holdren.

Secretary Vilsack.

STATEMENT OF HON. TOM VILSACK, SECRETARY OF AGRICULTURE, U.S. DEPARTMENT OF AGRICULTURE

Secretary VILSACK. Thank you, Mr. Chairman, and to Senator Chambliss and other members of the Committee, thank you for this opportunity to discuss with you today the role of agriculture and forestry in global warming legislation and climate change legislation.

Climate change, I believe, is one of the great challenges facing the United States and the world. President Obama believes it is important that America show international leadership on climate change. The Administration looks forward to working with the Senate to craft legislation that creates jobs, reduces our dependence on foreign oil, increases national security and reduces the risks associated with climate change.

Climate change has enormous implications for farmers, ranchers and forest landowners. Drought, more intense weather events, forest fires and insect and disease outbreaks are just some of the potential effects of a warming climate that could subject landowners and rural communities to enormous potential costs.

At the same time, farmers, ranchers and forest landowners have a very important role to play in addressing global warming. In fact, by effectively exploiting opportunities within the agriculture and forestry sectors, we can significantly reduce the cost of meeting our climate policy goals.

I also believe that there are significant opportunities for landowners in a cap and trade program that can help revitalize rural America. The production of low carbon energy from biomass, anaerobic digesters and wind will provide landowners with new sources

of revenue that have significant value in a low carbon economy. There are also options for landowners to reduce their energy expenditures. USDA is already working with landowners to reduce energy costs and to improve profitability.

A robust carbon offsets market will also provide farmers, ranchers and forest landowners with the potential for new sources of income. Rural communities could in turn benefit from jobs created to implement conservation practices and measure and monitor carbon offset activities.

To be effective in addressing climate change, the offsets market will need to accomplish two goals. First, the offsets market must be large, with thousands of participating landowners. To get to scale, the market will require an infrastructure of people and agencies that can encourage landowner participation, provide information to landowners, manage data and resources and maintain records and registries. Second, ensuring that agricultural and forest offsets provide real and verifiable greenhouse gas reductions is critical not only to addressing climate change but to maintain public confidence in the carbon offsets program as well.

Implementing an offsets market will require a partnership of several Federal agencies including USDA, EPA, the Department of Interior and others. USDA has many assets that we can bring to bear, including a network of field staff across the country and greenhouse gas management experience with croplands, rangelands, forests and landscapes.

Even with these opportunities, many in the agricultural and forestry community are concerned about the potential costs of climate change legislation. At USDA, we hear these concerns loud and clear.

Now there are a variety of specific approaches that one can use to achieve clean energy and climate goals. Over the last several weeks, USDA has begun in analyzing costs and benefits of the House-passed climate legislation for agriculture. Our analysis demonstrates that the economic opportunities for farmers and ranchers can outpace, and perhaps significantly outpace the costs.

An analysis of the implications of climate change legislation, including that of H.R. 2454, should show the farm sector will experience both costs and benefits. Agriculture, after all, is an energy-intensive sector with row crop production particularly affected by energy prices. Increases in fuel prices are expected to rise overall in connection with annual farm expenses by over $700 million between 2012 and 2018, or about 0.3 percent. Annual net farm income as a result of those higher energy prices is expected to fall by about 1 percent.

However, these estimates assume that in the short term farmers are unable to make changes in the input mix in response to higher fuel prices—an unlikely scenario, given past history. So they likely overestimate the cost to farmers. We believe fertilizer prices will show little effect until 2025 because of H.R. 2454's provision to help energy-intensive, trade-exposed industries mitigate the burden that emission caps would impose.

The agricultural sector will also benefit directly from allowance revenues allocated to finance incentives for renewable energy and agriculture emission reductions during the first 5 years of H.R.

2454's cap and trade program. Funds for agricultural emissions reductions are estimated to range from an additional $75 million to $100 million annually from 2012 to 2016.

The conservative estimated impact of the cap and trade provisions of H.R. 2454 implies a decline of annual net farm income of $2.4 billion or roughly 3.5 percent in 2030, $4.9 billion or 7.2 percent in 2048. These estimates are likely an upper bound on the costs because they fail to account for the farmers' ability to innovate in response to changes in the market conditions. This analysis is also conservative because it does not account for revenues to farmers from biomass production for bioenergy.

A number of studies have examined the effects of higher energy costs with models that allow for the expected changes in production management practices and switching to bioenergy crops. Based on the analysis of Schneider and McCarl, for example, allowing for changes in input mix and revenues from biomass production, but without accounting for income from offsets, it is estimated that the annual net farm income would increase in 2030 by $600 million. By 2045, annual net farm income is estimated to increase by more than $2 billion or 2.9 percent.

Now H.R. 2454 also creates an offset market, and we think that will also create additional opportunities for the agricultural sector. In particular, our analysis indicates that annual net returns to farmers range from about $1 billion per year for the time period 2015 to 2020 to almost $15 billion to $20 billion in 2040 to 2050, not accounting for the costs of implementing offset practices.

EPA has conducted its own analysis of returns from offsets that take into account the cost of implementing land management practices. EPA's analysis projects annual net returns to farmers of about $1 billion to $2 billion per year from 2012 to 2018, rising $20 billion per year in 2050.

It is important to note that EPA's analysis includes revenues generated from forest management offsets while the USDA estimate does not.

So let me clear about this analysis and its implications. In the short term, the economic benefits to agriculture from cap and trade legislation will likely outweigh the costs. In the long term, the economic benefits from offset markets easily trump increased input costs.

An economic analysis such as ours has limitations, but again we believe our analysis is conservative. It is quite possible that farmers will actually do even better than we predict as a result of technology changes and enhanced renewable energy markets.

What does this mean for the individual farmer? A North Plains wheat producer, for example, might see an increase of 80 cents per acre in costs of production by 2020 due to higher fuel prices. Based on a soil carbon sequestration rate of 0.4 tons per acre and a carbon price of $16 per ton, a producer could mitigate those expenses by adopting no-till practices and earning $6.40 per acre. So this wheat farmer does better under the House-passed climate legislation than without it, and it is quite possible that this wheat farmer could do even better if technologies and markets progress in such a way that allows for the sale of wheat straw to make cellulosic ethanol.

We recognize that climate legislation will affect different landowners in different ways. This is an important point, and USDA can help smooth this transition by using our Farm Bill conservation programs to assist landowners in adopting new technologies and stewardship practices. It is worth noting that the House bill also includes important provisions providing how to adapt and increase resiliency to climate change impacts, which will be important for our Nation's farmers, ranchers and forest landowners.

Ensuring that landowners and communities have the tools and the information they need to adapt to climate change is a priority for this Administration, and USDA looks forward to working with you as we move forward.

Thank you, Mr. Chairman.

[The prepared statement of Secretary Vilsack can be found on page 119 in the appendix.]

Chairman HARKIN. Thank you very much, Mr. Secretary.

Now we will turn to Administrator Jackson.

STATEMENT OF LISA JACKSON, ADMINISTRATOR, U.S. ENVIRONMENTAL PROTECTION AGENCY

Ms. JACKSON. Thank you, Mr. Chairman. Thank you to Ranking Member Chambliss and members of the Committee for allowing me to testify today. It is a pleasure to appear alongside my colleagues, Secretary Vilsack and Dr. Holdren.

As you know, the President has called for legislation to decrease our dependence on oil, to create millions of new jobs in clean energy industries and reduce the greenhouse-gas pollution that threatens our children and grandchildren. That call to action is as much about helping rural America as it is about helping urban America.

For example, the bill the House passed in response to the President's call includes a program to help American auto makers produce vehicles that use less petroleum-based fuel. That program goes beyond the cars used in cities and suburbs to include the trucks and non-road vehicles used in farm and ranch country.

The House bill also includes an incentive structure to catapult American companies forward in the burgeoning global market for clean energy technologies. Those American employers include not just the advanced battery manufacturer in Massachusetts and the solar panel installation firm in Arizona. They also include the wind tower manufacturer in Iowa, the biodiesel processor in Ohio and the bio-based insulation producer in Arkansas.

Finally, I would note the recent report by the U.S. Global change Research Program. It projected the impacts that we would see in America over the course of this century if we allow global warming to continue unchecked. Those impacts would not be limited to the urban coast of South Florida and the arid hills of Southern California. The Great Plains would experience more sustained droughts and increased infestation of insect pests. The Southeast would experience declines in livestock production due to heat stress and more frequent and intense wildfires, and the Midwest would experience reductions in water levels in the Great Lakes, more frequent spring flooding and more severe summer drought.

So, rural America is very much on the President's mind as he urges Congress to send him a bill that gets America running on clean energy. Meeting that goal will require each of us to make a modest investment. I applaud USDA for its ongoing work to quantify the investment that Americans raising crops and livestocks would be called upon to make. For its part, EPA projects that if the bill recently passed by the House were enacted, then gasoline and diesel prices would be 17 cents per gallon higher in 2020 than under business as usual.

But the House-passed bill includes provisions designed to soften many of the cost impacts that worry farmers. For instance, the program would distribute free emission allowances to energy-intensive, nitrogenous fertilizer manufacturers and wet corn millers. It also would distribute the value of emissions allowances to propane consumers such as the farmers who use it in drying corn.

Overall, EPA projects that the House-passed bill would entail an annual average per household cost of between 22 and 30 cents a day over the life of the program. CBO projects 48 cents per day in 2020. The costs would be higher in States where people regularly drive long distances and rely almost exclusively on coal for electricity, but, as CBO has explained, these regional differences likely would be small. And, even if the costs borne by the average household in a particular State were double the national average projected by CBO, that would still be less than a dollar a day in 2020.

Now the modest costs would be exceeded by the direct financial benefits that American farmers would receive. Under the House-passed bill, American farmers, foresters and ranchers would be the beneficiaries of a new, voluntary free-enterprise program in which they could, if they chose, receive money for offsetting other's emissions by increasing carbon sequestration on their lands or reducing methane emissions from their operations. EPA projects that the offsets generated by American farmers, foresters and ranchers in 2020 alone would have a market value of nearly $3 billion, and the amount would increase very year.

Fortunately, the U.S. Government is in a good position to establish a robust domestic offsets program. USDA has a network of field offices across rural America. Both EPA and USDA have scientific expertise in greenhouse gas management with croplands, rangelands, forests and livestocks.

For instance, since 1993, EPA has run the AgSTAR Program in which the Agency's technical experts work with farmers to find opportunities to capture methane gas and put it to profitable use. And, through its Climate Leaders Program, EPA has developed a series of offsets methodologies that now have undergone extensive review and testing.

The development of an offsets market will require a full partnership between relevant Federal agencies including USDA, EPA, the Department of the Interior and the Department of Energy. EPA looks forward to continuing an intensifying that partnership.

I thank this Committee for its constructive engagement with the agricultural community on clean energy and climate stewardship.

Thank you again for inviting me to be here today, and I look forward to answering your questions.

[The prepared statement of Ms. Jackson can be found on page 88 in the appendix.]

Chairman HARKIN. Thank you very much, Administrator Jackson.

Now we will turn to Dr. Holdren.

STATEMENT OF JOHN P. HOLDREN, Ph.D., DIRECTOR, WHITE HOUSE OFFICE OF SCIENCE AND TECHNOLOGY

Mr. HOLDREN. Chairman Harkin and Ranking Member Chambliss and members of the Committee, I certainly very much appreciate the opportunity to testify at this important hearing.

My mic was off. Did you get that?

Chairman HARKIN. Try it again.

Mr. HOLDREN. Chairman Harkin, Ranking Member Chambliss, members of the Committee, I do very much appreciate the chance to testify today at this important hearing.

My written statement for the record and my short oral statement here are focused on the scientific aspects of the relation between global climate change on the one hand and agriculture and forestry on the other. That relation is a multifaceted one. Farming and forestry practices are significant sources of the emissions that are driving global climate change as well as points of particular vulnerability where climate change imperils human well-being by reducing the productivity of the land. With appropriate management, on the other hand, farms and forests can become the locus of increased carbon storage that draws down the atmospheric load of carbon dioxide, and they can serve as sources of renewable low carbon biofuels.

Although it is the case today that climate change has benefited farms and forests in some places while harming the in others and that mixed pattern may persist for some years more, there can be little doubt that the larger temperature increases expected by 2030 and beyond on a business as usual trajectory of climate change are going to put substantial stresses on farms and forests in most places.

Those stresses can be alleviated to some extent by adaptation efforts of a variety of kinds, of course, including development of heat, drought and pest-resistant crop strains, more efficient water management strategies for agriculture and more. We absolutely need to make well-focused and effective investments in these kinds of adaptation measures.

But adaptation becomes more difficult, more costly and less effective the larger are the changes in climate to which one is trying to adapt. The need to restrain climate change to a level with which affordable adaptation measures can plausibly cope is what has led so many analysts of this problem to conclude that every effort should be made to avoid exceeding a global average temperature increase of 3.6 degree Fahrenheit, that is 2 degrees Celsius, above the pre-industrial level.

Looking at the numbers on what would be required to achieve that goal makes clear that the agriculture and forest sectors simply must be part of the program. We will need the reductions in emissions that can be had by reducing tropical deforestation and by modifying the agricultural practices that currently account for sig-

nificant methane and nitrous oxide emissions. We will need the increase in absorption of carbon dioxide that can be had from afforestation and reforestation and improved management of agricultural soils. And, we will need the contributions that expansion of sustainably produced biofuels can make to reducing our dependence on carbon dioxide-emitting coal, oil and natural gas.

All of these opportunities are sufficiently well understood scientifically to support implementation of policies and activities to help us get from the farm and forest sectors the contributions needed from them if the challenge is to be met. At the same time, continuing to improve our scientific understanding of the relevant processes, including our capacity to measure and monitor them quantitatively on local to regional scales, will be valuable for increasing confidence that the performance specified in policy and international agreements is indeed being achieved, for developing improved understanding of some of the currently less well-researched options in the agricultural and forest sectors for both mitigation and adaptation and for refining our policies in the decades ahead.

Achieve the high confidence that decisionmakers and the public will want concerning offsets and the reality of emissions reductions or uptake increases claimed for other initiatives in the agricultural and forest sectors will have to rely in substantial part on existing tools such as the EPA's National Greenhouse Gas Inventory, land use data, carbon cycle modeling and the project-based monitoring approaches that have been developed by EPA and USDA.

At the same time, our current observation networks for emissions and absorption of carbon dioxide and other heat-trapping gases are not adequate for some kinds of the monitoring that would be desirable, and a continuing effort to strengthen the network of ground-based, air-based, ocean-based and space-based measurements of those fluxes is warranted.

The many approaches for deriving clean fuels from plant material differ in their state of technological development, the efficiency of energy conversion, their requirements for land and water and other inputs such as pesticides and fertilizers, their cost, their net benefits in reducing greenhouse gas emissions when all of the inputs, as well as influences on soil and vegetation where the material is grown and elsewhere, are taken into account and other environmental and social impacts, positive as well as negative.

While much is known about those factors, the technologies are evolving and so is our understanding of their full range of characteristics. I believe we know enough to define appropriate metrics to help with choosing options and regulation, but we will get better at it as our scientific understanding of the details improve.

Continuing to strengthen the scientific foundation for policies and strategies in this domain going forward is going to bring significant rewards in terms of our confidence in the performance of the approaches that are put in place, in terms of the ability to improve those approaches over time and the capacity to develop additional options for farm and forest-based climate change mitigation and adaptation for the future.

The White House Office of Science and Technology Policy is energetically engaged, together with the full range of relevant Cabinet

departments, other Federal agencies and White House offices and with our partners in the wider research community and the Congress, in ensuring that this happens. My colleagues in the White House and I look forward to working with this Committee and the rest of the Congress to that end.

I thank you for your attention. I will be pleased to try to answer any questions you may have.

[The prepared statement of Mr. Holdren can be found on page 79 in the appendix.]

Chairman HARKIN. Thank you very much, Dr. Holdren.

We will begin a series of 7–minute rounds here, if we get our clock going here right.

Mr. Secretary, first of all, thank you very much for getting the analysis to us that you did on this. I would just like to ask again and have you expand a little bit on this, that what you are saying basically in this analysis is that for the near term—let me look at my table again here—for the near term, 2012 to 2018, that the increase in total expenses on agriculture would be $0.7 billion it looks like. I think that is right. Is that $0.7 billion per year?

Secretary VILSACK. Senator, that is correct, but that is not necessarily the net farm income number if that is what you are looking for.

Chairman HARKIN. So it would be an increase of $700 million per year in real dollars on average.

But then you are saying that on the other side of the equation is that the offset markets could cover these costs. Is that right?

Secretary VILSACK. Senator, that is correct, but if I can just expand on it just a bit.

It is somewhat difficult to conduct a full and complete analysis because there are many, many variables. What we tried to do is to come up with a very conservative estimate of the impact, and, by conservative, I mean we did not take into consideration in looking at the expense side.

There are basically two components to it. There is the direct and indirect energy costs. Direct costs would be fuel for tractors and combines. Indirect would be fertilizer.

We did not ask ourselves or try to include in the evaluation what changes would be made if fuel prices were going to go up, so that farmers would end up figuring out how to use less.

Now, since 1970, we have seen a fairly consistent pattern of farmers basically figuring out how to do more with less, but we did not factor that in nor did we factor in any technology changes that could potentially impact fuel usage nor did we figure in the impact of increased opportunities on the bioenergy side. So there are things that would potentially impact and affect this expense number which have been evaluated in other studies, and other studies would obviously see this total expense number lower.

So, depending upon, what we tried to do is give you a range, and the most conservative estimate is you are looking at $700 million on the expense side. On the more inclusive evaluation, that number is significantly lower. In fact, we think that there is a possibility of increase in net farm income in the early years as a result.

Chairman HARKIN. I take it from your testimony, Mr. Secretary, that you actually feel pretty bullish about this, that really there

are more opportunities out there for farmers and ranchers to actually gain income from a cap and trade as long as there are decent offsets and as long as we have some other provisions I assume that I have not talked about in there, and that really the farmers, while their expenses may go up a little bit, they have more to gain from offsets.

Secretary VILSACK. Senator, I think that is true.

You know some will suggest that there is a difference between a farmer who is raising corn and a farmer who is soybeans and one who is raising rice. There are regional differences. There are product commodity differences.

But, on the whole, farming and agriculture in this Country, I think, will benefit. And, I think also the rural communities that farmers support and live in will also benefit because we are not factoring into any of this the job creation opportunities that are presented in rural communities.

Chairman HARKIN. Ms. Jackson, in the 2007 Energy Bill, we committed to a steadily increasing supply and use of biofuels as a key element of our national strategy to reduce dependence on petroleum. We need to make sure the marketplace can accommodate that increasing supply, and the key issue today—the key issue—is what we call the blend wall for ethanol. The amount of ethanol being produced soon will exceed the amount that can be used as 10 percent, E10.

Your Agency is considering a request to grant a waiver that would allow ethanol blends of up to 15 percent to be used in gasoline-fueled vehicles.

Now, again, the 10 percent, I went back and looked. How did we ever get to 10 percent? That was just plucked out of thin air in the Clean Air Act, and I remember when that was passed.

We have had a lot of data, and I have seen a lot of information come in that it could be as high as 20–some percent. That would have no effect whatsoever on present state internal combustion engines.

We were talking about just a waiver up to 15 percent which would give us half again as much use of the ethanol being produced. When can we expect a ruling on that request and could you address yourself to the possibility of increasing the blend wall to 15 percent?

Ms. JACKSON. Sure, Mr. Chairman. The public comment period on the waiver request to increase the ethanol content of gasoline from 10 to 15 percent actually closed just a few days ago on July 20th. EPA received thousands of comments, and, as we are required to do, we are evaluating those comments as well as data from several sets of tests, engine tests that are being performed jointly with the Department of Energy and some information that we are getting from the Department of Agriculture. The Clean Air Act gives the Administrator up to 270 days which would end on December 1st of 2009 to render a decision.

Chairman HARKIN. Ms. Jackson, you just came onboard EPA, but there is a feeling among some of us. I always speak for myself. I cannot speak for any other member of this Committee, but I talk to a lot of people around in agricultural circles, obviously. I have been on this Committee a long time.

There is a sense. I will be very frank with you. There is a sense among a lot of us that there is a built-in bias within EPA against biofuels, that there is a bias somehow that an initial mistake was made when we first started our biofuels program and that we need to put an end to it as soon as possible.

Now that could be wrong. I am just telling you in all frankness there is that sense and that feeling among a lot of us, that there is some bias at EPA against biofuels.

I hope that you will not take that as any kind of a bad remark. After all, you just got there. I am not talking about you. I am just talking about going back 20 years and some of the battles that we have had with EPA going back that time on ethanol.

So I hope that we can expect this ruling on the request, and, of course, we will take a close look at it, very close to make sure that it is really scientifically based when it comes. But you think we will have that ruling before when?

Ms. JACKSON. Well, the deadline in the Clean Air Act is up to 270 days, and there are two crucial pieces of information. The first is the public comment period which has just recently closed, and the second are the results of the engine tests that will, I think, provide the scientific and factual background that can support a determination of what the impact would be on engines.

Chairman HARKIN. So, by December?

Ms. JACKSON. That is what we are looking for. December, yes.

Chairman HARKIN. It could be before?

Ms. JACKSON. It could be before, sir. But we did get lots of comments, and we do need the results of the testing from DOE.

Chairman HARKIN. Thank you very much, Administrator.

I now turn to Senator Chambliss and then in order of arrival, as has always been the procedure in this Committee, Senator Nelson, Senator Bennet, Senator Johanns, Senator Stabenow, Senator Leahy, Senator Casey and Senator Roberts.

Senator CHAMBLISS. Thank you, Mr. Chairman.

Secretary Vilsack, as I understand it, what you do is you model these analyses based on history, I assume, of input costs as well as revenues that are generated, and that is the way you came up with your overall analysis relative to the impact of the House-passed bill on agriculture. Am I correct in stating that?

Secretary VILSACK. I think that is correct, Senator. We also, obviously, utilized information from the EPA as well.

Senator CHAMBLISS. OK. Now Administrator Jackson said that she anticipates that by 2020 you are going to have a 17 cents per gallon increase in gasoline. Is that the input cost that you used on gasoline?

Secretary VILSACK. We used the EPA numbers relative to fuel, and then we utilized them within a simulated model that USDA has used for quite some time to factor in other expenses and other income opportunities.

Senator CHAMBLISS. OK. I understand that your analysis only models the impact on nine crops, and that does not include a discussion on specialty crops and no mention on the impact on livestock, which are the two sectors that generate the greatest amount of farm income annually. Can you explain why those two sectors were excluded?

Secretary VILSACK. Senator, I think that there was a discussion and review of crop prices and its impact on livestock. So the evaluation does discuss livestock.

The issue of specialty crops, we are in the process of obviously continuing these evaluations in a continuing analysis. We tried to get as best we could information on the crops that were relatively easy to calculate.

Senator CHAMBLISS. The USDA analysis estimates the gross revenues associated with offsets and yet tries to compare those with the costs incurred by farmers and ranchers. Could you please explain if the offset income noted in the long-term analysis is for soil sequestration by row crop agriculture or, if as EPA does or EPA notes, does the majority of the benefit go to afforestation?

Secretary VILSACK. As you can see—I do not know if you have the chart in front of you—on Table 8, the estimated revenues look at afforestation and soil carbon long-term methane and nitrous oxide reductions. The combination of those two on the long term, we are talking about roughly $20 billion, and then forest management is another $8.2 billion.

Senator CHAMBLISS. I am sorry. Run through that again with me, Mr. Secretary. My brain does not operate that quickly here. I am looking at Table 8 right now.

Secretary VILSACK. Well, if you look at Table 8, there are three items, two under the Ag Offsets category, if you will, and one under Forest Management. The Ag Offset category is afforestation and soil carbon and then methane and nitrous oxide reductions. I mean there are multiple strategies here for addressing how offsets can be calculated.

We understand and appreciate that EPA was making certain projections relative to forests and the amount of tress that would be grown. That is part of the equation. It is, by no means, the only equation.

There are a number of farming practices that could be adopted that would ultimately qualify for credits as the bill is currently drafted. We would anticipate that in partnership the Federal agencies would probably, as we learn more about this, expand the list of practices and be more specific about the practices, but based on the bill as it exists today this is our estimate.

Now there are other estimates that show an even better picture for agriculture because they take into consideration technology changes. They take into consideration bioenergy opportunities. They take into consideration strategies that farmers might embrace to reduce their input costs which has been historically what farmers have done.

Senator CHAMBLISS. Given the quick pace of the House's consideration and passage of the American Clean Energy and Security Act, I understand that there was not much time to think through the implementation aspect of the agricultural offsets program.

Now that you have had about a month to think about it, how do you envision the Department would operate the offsets program, what agency or agencies would administrate the program and how would the Department interface with producers who want to participate?

Secretary VILSACK. Well, Senator, we obviously recognize the role that the Senate is going to play in the crafting of this proposal. I will say that we are prepared to work in partnership with other Federal agencies. Several have been mentioned today. And, I think it is going to be appropriate to have that partnership.

This will be a significant undertaking, and each department has individual and unique assets that allow it to have expertise and knowledge. In our particular case, we have field staff in every county, virtually every county in the Country, which allows us to have eyes and ears on the ground for verification purposes.

Certainly, EPA and USDA have expertise in terms of the calculations and determinations of precisely what is being absorbed and what is being sequestered and how agriculture is being impacted by all this, and so I would see a partnership between our agencies. The Department of Energy will be involved. The Department of Interior will also be involved. So I think it is a partnership that we envision, and USDA is prepared to take the roles that are assigned to it by policymakers.

Senator CHAMBLISS. We had a discussion with the panel this morning relative to the potential for tariffs to be imposed on those countries that do not follow the lead of the United States if some sort of cap and trade legislation is enacted. Very clearly, it is going to impact our ability to export in the world market, and I am one of those who has long advocated the fact that the future of American agriculture and our ability to make a profit depends on our ability to export our products.

China and India, two countries that are probably the biggest competitors for our cotton farmers here, have already stated flatly that they do not intend to take any action irrespective of what we do.

Mexico is not likely to take much, if any, action. A country like Mexico that has a huge export of agricultural products into the United States would be one of those countries that was discussed this morning that might potentially have tariffs imposed on it.

What is your thought about other countries we deal with and whether or not tariffs ought to be imposed on agricultural of those countries that do not participate in some sort of cap and trade program?

Secretary VILSACK. Senator, I would agree that it is in the long-term best interest of farmers and ranchers in this Country to have robust trading opportunities globally. Clearly, agriculture is one of the bright spots in terms of trade, and we have a trade surplus of roughly $12 billion. Obviously, it will be up to USDA to work with our farmers to make sure that that continues.

I am not sure that I am willing with respect to acknowledge the foundation of your question which is that countries internationally will not do anything on this area. I think the reality is that many countries, as I have traveled extensively last year for the Council on Foreign Relations report on the international consequences of cap and trade and climate change and in visiting with international leaders, with foreign leaders, with dignitaries on this issue, I got the sense that they were waiting for the United States. They wanted to see action. They wanted to see leadership from the United States.

My view of this is that the world is waiting for us. When and if the United States moves, I think we will create, along with many other nations, a significant amount of momentum.

Will what other countries do be precisely what we agree on or precisely in the process, I do not know. But I would be very, very doubtful that countries as large as China and India will essentially do nothing on this. I really expect them to be participating in some form or another.

Senator CHAMBLISS. Well, obviously, if anything is enacted here, I would hope you would be correct in that prediction. But the fact is, Mr. Secretary, they, this week, have told Secretary Clinton that basically we can do whatever we want to, that they do intend to do nothing.

You know from the standpoint of competing in the global market, they are tough competitors and they are direct competitors with our farmers.

I think that question obviously is a difficult question to answer except, from the standpoint of tariffs, I just hate to see us get into a contest where we are throwing rocks at other countries for their failure to take action and knowing that we are going to be put at a disadvantage because they are going to retaliate in some sort of similar activity. So I hope if as we move down the line, and we will have other discussions about this, that we can have some additional conversation about what might happen if that does come about.

Thanks, the Chairman.

Chairman HARKIN. Thank you, Senator Chambliss.

Now we will turn to Senator Nelson.

Senator NELSON. Thank you, Mr. Chairman.

Thank you for being here, Secretary Vilsack, Administrator Jackson and Dr. Holdren.

I know the frustration is there of how to improve the environment without adversely impacting the economy and to do so in the reality of a world where, as my colleague from Georgia has indicated, some other countries have shown little or no interest in assuming some of the costs in curtailing their emissions. And so, I hope that we can pursue the most economically prudent model. The question is with a cap and trade, in my opinion, is whether that is the model.

Has either of your agencies or the White House done any kind of analysis of just instituting a straight cap on emissions without a trading mechanism which I quite honestly feel will create a new monetary system, trading in these credits? Do we have any modeling just on a cap without trade?

Ms. JACKSON. Senator, EPA has not. We know that it would be expensive, but we have not done an analysis of that situation.

Senator NELSON. Well, when you know it would be expensive, what does that mean? More or less expensive than cap and trade?

Ms. JACKSON. Well, since I have no analysis to back up my statement, I do not want to say relatively. But we know that EPA in its regulatory roles on other contaminants knows that there is always a cost to regulating a contaminant.

Cap and trade has proven an opportunity to involve the marketplace in mitigating costs. The offsets program discussed earlier is one example of a way to mitigate those costs.

Senator NELSON. Well, my mail is running about 99 to 1 against that. I use the parade analogy as well. That is what are people yelling at you when you are walking in a parade? It is no to cap and trade.

So I am concerned that if this is going to be the approach that is taken, that it be the most benign method of dealing with the importance of balancing the economy and the environment. It is not just about agriculture. It is about individuals who turn on the lights at home and business as well.

Is it possible? It seems to me, and you do not have the data to back this up, so maybe I just state this in a positive way as opposed to a question. It seems to me that a cap without the trading piece is likely to give us a more levelized increase and less volatile rise in energy prices over the volatility that the market is going to experience with the allotment of allowance and market of trading credits.

In Nebraska, which is 100 percent public power, unique—no other State is 100 percent public power—I am told that the cost of the credits will add significantly to the cost of electricity generation in the State. It is not just agriculture. It is across the board. So, obviously, I am quite concerned that whatever we do, if anything, that it be the least invasive in terms of raising the cost of electricity in the State.

I just think that a more resounding effect would come from a cap without trade over a reasonable period of time to transition to the kind of technology, and maybe Dr. Holdren is the person to talk about the technology, to develop the technology to overcome the growing emissions.

Mr. HOLDREN. Senator, maybe I can just take a very brief crack at this.

The different options for achieving reductions in greenhouse gas emissions have certainly been looked at in the White House largely on the basis of the existing economic literature, which is very large, and what that literature says is that the cost of a straight cap without trading will be higher than the cost of achieving the same emissions goals with the cap and trade system. The reason is the cap and trade system allows people to look for and exploit the lowest cost, most efficient emissions reductions that are available, including reaching into the area of offsets in the agricultural and forest sectors. So the idea really is to find the most economical way of achieving the emissions reduction targets that we are interested in.

Senator NELSON. Secretary Vilsack, in doing the modeling at the USDA, did you follow the modeling set forth by EPA? I guess perhaps you did as it related to some of the analysis, but was there any other modeling done that might provide additional insight as to what the impact of this program might be?

Secretary VILSACK. Senator, what we did is we took information from EPA and we utilized a model that we have been using at USDA for some time to model impacts and came up with what we think is a relatively conservative view about this because we did

not factor into it, as I said earlier, technology changes, adaptation by farmers and ranchers. We did not look at the potential impact on bioenergy and the positive aspects of that. We did not look at the impact of the renewable energy standard that might create more opportunities. None of that was calculated.

Now there have been other models, Senator, outside of USDA that actually attempted to calculate the impact of those changes. Obviously, they came up with less expense and more net farm income than our model, and the offsets would be something in addition to that.

So we are looking initially at the impact directly on farming and then income opportunities from the offsets program. Our view is in the short term it is a plus for agriculture. In the long term, it is a significant plus.

Other studies have suggested in the short term it is an even bigger plus than we have calculated, and in the long term it is roughly equivalent to what we calculated. EPA has done its own analysis, and I think we have created what, for you, is a range, is a sense.

I think what I would like to say is it is my view that, all things being considered, what we know today is agriculture and rural communities will benefit in the long term from this approach. And, I have great confidence in American farmers and ranchers to be innovative and to be adapting and to be embracing technology. That has been their history. That is going to continue to be their history.

Senator NELSON. Thank you.

Thank you, Mr. Chairman. Thank you all.

Chairman HARKIN. Thank you very much, Senator.

Senator Stabenow and then Senator Bennet, Senator Johanns and on down the list.

Senator STABENOW. Well, thank you, Mr. Chairman, and welcome to all of our witnesses today. We appreciate all of your work in so many different areas.

Mr. Chairman, thank you again for this very thoughtful hearing today.

Let me start with Administrator Jackson. I want to talk about the role of the USDA and the EPA because it is so important as we move forward on what is an essential part of this bill, offset bill, and I believe also an incentive program under USDA. But as we are working through drafts and looking at language as it relates to an offset title, one of the biggest issues really is clarifying the roles between the two agencies, the two departments.

The result has to be the fact that we have assurances that we are going to have projects that are backed by scientific integrity, no question about that, but we also need to have certainty to the regulated community that offsets will in fact be available.

I understand that the EPA will be one of the agencies that will ensure the operability of a cap and regulatory obligations, the agency. It is also critical that USDA implement the agriculture and forestry offsets program and that in fact it be more than consultation, that in fact it be the agency that is implementing the program.

So, as we are working out all the details, I wonder if you might just speak about the EPA's history of working with other agencies. We have two agencies. There has been concern about the different

cultures or perspectives of the two agencies. But I wonder if you might talk about how you view working together to implement this very important section and what has been the agency's experience in joint cooperation with other agencies as well.

Ms. JACKSON. Thank you, Senator.

First, I would like to say that if our agencies can work as well together as I do with Secretary Vilsack I think we will be in very good stead. I have enormous respect not only for his knowledge of his industry, of agriculture, but his knowledge on this issue, on the environmental aspects and the potential benefits for the environment as a whole as well as what we can do for our agriculture. And, I obviously think we both have important roles to play.

We have history, and it troubles me to know that there is some bad history. But there is also some very good history, and I am committed to bringing that forward.

We have worked with USDA Natural Resources Conservation Service under the EQIP Program to help growers in California who are in severe on-attainment areas for ozone, a big issue because obviously their operations impact ozone levels. What we have done together is work on replacement of older diesel engines that have high levels of NOx emissions that are creating ozone problems, and we have worked on new certified diesel engines together to address that issue.

We work very well together on the Food Quality Protection Act where each of our agencies has co-chaired separate committees that consulted extensively during the promulgation of the FDA rules, where EPA's role there is actually written into the statute—very effective process.

We work very well together, I think, on international limits and domestic issues related to pesticide residues. That is not to say that we do not come at it from different angles, but we find invaluable the input from USDA on those programs.

We work with other agencies as well. We have worked collaboratively on any number of issues with FDA and certainty with the Department of Energy.

Senator STABENOW. Thank you very much.

Mr. Secretary, to you now, a similar kind of question, but I want to speak about the capacity of the USDA to focus on climate change and the offsets program.

I understand that the Global Climate Change Office has been studying agriculture's role for some time and has even been contributing currently to our international efforts. I also know that the USDA is developing the Office of Ecosystem Service and Markets to look at methodologies and standards for carbon projects such as offsets. I joined with Senator Lugar and 10 other Senators in a letter supporting the work of these two offices recently, encouraging you to continue to develop both of those.

But I wonder if you might talk about and assure the Committee that the USDA has the history, the capability to implement an offsets program and that it can be done with strong scientific integrity so that we and the private sector will be able to depend on the fact that there will be offsets for quality projects.

Secretary VILSACK. Senator, first of all, let me join with the comments of Administrator Jackson in terms of our personal working

relationship. It cannot be closer, and it is a very solid relationship. The respect that she has for me is certainly equal to the respect that I have for her and her background and her knowledge and her way of approaching problem-solving, which I think is important for agencies to be able to do, to be able to work things through when there are difficulties or differences of opinion. So I value that friendship and that relationship.

I would say that I am very proud of the extraordinary outreach efforts that we have within USDA. We have a lot of hardworking folks working in communities all across this great Country, and they are anxious to be part of this process if you, the policymakers, make a decision that there is a role for USDA. We are prepared to accept that role, but, obviously, that is your decision.

These are folks who, because of their work in conservation programs, are somewhat familiar with the capacity to verify activities that take place. We have been criticized for some of our efforts in conservation in terms of some of the work that has been done recently. We are aware of those criticisms, and we are in the process of responding to them. So I think we will be an even stronger agency than we have been in the past by virtue of the Inspector General's report. So we are prepared.

I would also say that it is important for us to do our work well. To Senator Nelson's comments, part of the capacity of a market to work is that people have confidence in the market. In order to have confidence in the market, you have to know that when a credit is being given and value is being assigned to it and it is for sequestering a certain amount of carbon, that in fact that is occurring.

I think it is important, relevant, that we understand the significance of our work connected to the significance of the quality of the market, the validity and the merit of the market. So we are anxious to be helpful, and we are anxious to work in partnership with other Federal agencies if that is the decision you all make.

Senator STABENOW. Thank you, Mr. Chairman.

Chairman HARKIN. Thank you, Senator Stabenow.

Senator Bennet.

Senator BENNET. Mr. Chairman, thank you for holding this hearing and thank you all for coming and giving us your testimony.

This is one of the most complicated issues, I think, that we are going to face in the Senate, and I think no one has a monopoly on wisdom on these issues. We are going to have to hear from a lot of people, a lot of different ideas.

I, for one, look forward to working with my colleagues here and others on what is a tough, tough challenge, but I was reminded this week. You know in Colorado water is everything, especially for agricultural producers.

Dr. Holdren, I wanted to ask you because on Monday a new study from the University of Colorado at Boulder, one of our Nation's premier research universities, was published, indicating that there is a one in two chance that the water reservoirs of the Colorado River will dry up by 2050. I do not know if I will still be around, but my children certainly will, and the Colorado River is the lifeblood of communities across Colorado, Arizona, Utah, Nevada. It enables agriculture in California's Imperial Valley not only to exist but to flourish.

So, Dr. Holdren, in your testimony, you talk about climate change shifting weather and water patterns. Is this the kind of phenomena that you are talking about and could you elaborate a bit?

Help us better understand why climate change would so dramatically alter water flow. How would changing water patterns affect agriculture? How are water, energy and agriculture linked?

Why and would a climate bill make a difference?

Mr. HOLDREN. Well, Senator, that is a big question, but I will do my best with it.

As I mentioned in the testimony, there are a number of different ways in which the global climate change that is underway influences water availability, including not only surface runoff but soil moisture. Part of that is that changes in relative heating of land and ocean areas produces changes in circulation patterns which changes where the rain falls. As it happens, somewhat perversely, the overall pattern is that places that are already tending to be semi-arid, water-short, over time are likely for the most part to become even more so because of these changes in circulation patterns in the atmosphere.

That is happening in the United States. It is also happening in other parts of the world, for example, China, where changes in the monsoon that the Chinese themselves have concluded have been driven by global climate change have aggravated flooding in the south of China and drought in the north, which is a longstanding problem for them.

A second aspect of this phenomenon is that in a warmer world more water evaporates. That sounds good for water because what goes up must come down. More evaporation means more rainfall.

The problem is that with more water in the atmosphere as a result of more evaporation a greater proportion of the rainfall comes in deluges, and deluges have the characteristics that a larger proportion of the water runs off quickly in storm runoff and is not captured in soil moisture or n reservoirs and, therefore, is not available. The second aspect of having more of it come down in deluges is there is typically a longer interval between those deluges during which the higher air temperatures that are coming from the warming phenomenon overall increase the evaporation.

You have less of the total precipitation available, longer periods between precipitation in which the soil moisture is evaporating away, and the projections therefore for much of the Western United States, and particularly the Southwest but many other parts of the world, is a very substantially increased incidence of drought over the decades as ahead as climate change increases. Drought, of course, is bad for agriculture.

Senator BENNET. I get the collective action problem that was talked about earlier, about do we go first, do we wait for these other countries to go first, how does all that work.

What I can tell you is that in Colorado now we are confronting these issues because of the water shortages that we have. From my perspective anyway, if we are going to be able to assure that another generation of Coloradans are able to farm or one after that, we need some answer to this question on how to reserve our water resources. This, I think, is part of it.

Mr. Secretary, I just wanted to ask you quickly if you could speak a little bit more about the potential for farmers in rural communities to sell offsets for practices like improvements in soil management, optimization of crop rotations, improvements in livestock management. All seem like potential economic benefits. We have not seen them yet, so we are not sure, but they could be hugely important to our rural communities.

I wonder if you could talk a little bit more about the economic opportunities that you see here.

I should say having seen you out in my State, on the question of whether USDA is ready for this, if the ability to withstand tough questioning is part of that, you certainly meet that test. I appreciate your being out there.

Secretary VILSACK. Thank you, Senator.

Farmers and ranchers in this Country, I think, are extraordinary innovators. When you take a look at the level of productivity that we have seen in American agriculture over the course of the last 30, 40, 50 years—take whatever timeframe you wish—you are going to see an extraordinary amount of productivity, productivity that feeds our families and helps to provide food for the entire globe.

One of the reasons they have been successful is that they have been adapters. They have been innovators. They have been embracing new technologies.

We have an annual event in my hometown of Mount Pleasant. It is called the Old Threshers Reunion. They bring out the old steam-powered threshing machines and the old tractors, and you compare those to the tractors and combines and farm machinery that are being produced in John Deere plants in my home State in Waterloo and Ottumwa and Ankeny. It is absolutely phenomenal. So I am convinced that there is going to be significant innovation.

What we attempted to do in this analysis was to say, look, let's put that innovation for the time being aside and let's see if we can get a handle, a range on how this might impact folks.

What we concluded was that when you take everything into consideration—the capacity for offsets, the impact on fuel costs, the impact on indirect energy costs—the reality is for farm and agriculture generally we are going to see opportunity.

Now folks will ask me about various types of farming in various regions of the Country, and, obviously, there will be differences between what farmers do in Colorado and what farmers do in Iowa. But if we cannot participate, if our farmers cannot participate in this particular program, then there are a whole host of other programs that we can direct and provide assistance for. So, between the farm programs, the conservation programs, this, the energy title of the Farm Bill, broadband—this is apart from your question—there is enormous opportunity in rural America.

In fact, I would argue that what we are seeing is one of the most significant, if not the most significant, investment in new opportunities in rural America that we have seen in a long, long time, maybe in my lifetime, if we take advantage of it.

Then, if we do take advantage of it, then we are going to see windmill manufacturing facilities in our States. We are going to see new bio refineries being located in our States. We are going to see

companies that can make anhydrous ammonia out of corncobs and reduce our reliance on petroleum. And, that is all going to create jobs, and many of those jobs are going to be located in rural communities throughout the Country.

So I think there is an opportunity side here that is often is not appreciated. We can argue about the numbers, and we can fiddle with the numbers. But I think at the end of the day the innovation history of agriculture is one of America's success stories, and I think with this we will see a continuation of that.

Senator BENNET. Thank you.

Thank you, Mr. Chairman.

Chairman HARKIN. Thank you, Senator Bennet.

Senator Johanns.

Senator JOHANNS. Mr. Chairman, thank you.

I must admit I was listening with some degree of amusement when Senator Nelson was talking about our parade experiences. As the junior Senator, I follow him in Nebraska parades, and, yes, they were yelling at us: Vote no on cap and trade.

You are at a different point than where most of the American people are, and I will just be blunt about that, and let me walk you through why.

Administrator Jackson, recently, you testified, I think it was you, and said, after you pass this, you are going to have a very negligible impact—I am probably not using your exact words—on temperature.

So the chart that the Chairman was using, the other facts that have been brought to your attention, what you are saying is if the United States passes this bill, we are not going to impact temperature in any significant degree. Is that not correct?

Ms. JACKSON. Senator, you are referring to a question at a recent Senate EPW hearing that asked about whether or not we would have an impact—alone, we could have a significant impact on global CO2 concentrations in the atmosphere. We did not actually talk about temperature.

What I said is, alone, I did not think we could get to a significant enough level to solve the climate change problem. I also went on to state that I recognize that we need others to join. I will tell you here, I do not think we have to do it all at the same time.

Senator JOHANNS. But, you see, here is the problem. Poor Tom Vilsack has to go out there with that testimony and try to convince farmers on a hope and a prayer that somehow this is going to work out.

I turn to my attention to you, Mr. Secretary. When you talk about the offsets, I noticed in both the charts from the EPA and the charts from the USDA you have clumped together farmland and forests, and they are two vastly different things. Tell me how much farmland is going to be taken out of production as a result of this climate change effort if it were to become law.

Secretary VILSACK. Senator, it is funny you should mention that. I was speaking to State foresters yesterday, and I asked them to define for me a forest. Their view was that what you and I would normally think of, like a national forest, was not their view.

Their view was if you have trees on your farm. If you have, as I do on my farm, roughly 90 acres of timber, I have a forest. Now

I would never have considered that a forest, but those in the business do consider it a forest. So I guess there is a definitional issue here.

You ask the question, how many acres are going to be displaced? I do not know that anybody. I mean the EPA estimated a number of a million acres of farmland, but my point is this.

Senator JOHANNS. I know your point.

Secretary VILSACK. I do not think you do.

Senator JOHANNS. By number of acres, just the question asked, how many acres go out of farm production?

Secretary VILSACK. Well, the problem with that question is that it assumes that there is no increase in productivity in farming because if you increase productivity and you have the opportunity to take marginal land and you create offset opportunities from that, you have increased the possible income for farmers as we are doing with conservation programs.

Senator JOHANNS. But here is the question.

Secretary VILSACK. Then the question becomes what about CRP in terms of the options that people have? So it is difficult to answer your question because I am not willing to concede that there will be a lack of productivity and I am not willing to concede that we are not going to take land that is in CRP and use it for forests.

Senator JOHANNS. Mr. Secretary, I am not even asking about productivity at this point.

I am just asking, you or maybe the Administrator can tell me in your forecasts how many productive acres of farmland will go out of production. We will start there, and then I will ask other questions.

Secretary VILSACK. Go ahead. You can answer it, and then I will be glad to add something.

Ms. JACKSON. Senator, I do not have a number for you here. I have heard numbers that are being attributed to EPA's modeling efforts that are on the order of tens of millions of acres. We are looking into that.

But what EPA's modeling efforts say, the analysis, the conclusion you can draw is that if an offsets program is geared around afforestation such that farmers could be paid voluntarily to grow trees, there is possibly the idea that many farmers will choose, choose voluntarily to do that. But we do not have a firm estimate on that number with me.

Senator JOHANNS. In your charts, the USDA relied upon the EPA analysis of June 23rd. In your charts, on Page 33 of that analysis, you say this: Because overall land area in crops declines due to afforestation, the modeling indicates—so you had to have some acres to model it—a net decrease in total agricultural soil carbon storage as carbon is transferred from the agricultural soils pool to the afforestation pool.

Now the whole purpose of this hearing is just to be honest with people what is going out of production because the important thing about that is that affects the pork producer, the cattle guy, and it beats living daylights out of them. Why? Because your prices are going to go up.

They are out there saying, look, my input costs are going to go up with electricity and natural gas and any fertilizer I have to buy.

Just tell them how many acres are going out of production.

Secretary VILSACK. Senator, the problem is that qualifier, how many acres are going out of production, because that assumes that the forests are going to be planted and the trees are going to be planted on land that is currently in production.

What I was trying to suggest is what you are now providing is another option to conservation programs. So it may be that farmers choose not to take the acre where they are growing corn out of production. They are going to take the acre that is currently in the CRP program or another program.

Senator JOHANNS. I know what you are saying, Mr. Secretary, but I read this language. I did not write this language. I am only trying to get to the bottom of it.

Acres are going to go out of production. You used some number in your model. What is that number?

Secretary VILSACK. Senator, I think what——

Senator JOHANNS. That was directed at the Administrator.

Secretary VILSACK. Oh, I am sorry.

Ms. JACKSON. Thank you. Senator, I do not have a number of acres that go out of production. I did listen carefully to the qualitative language that you read, and the assumption is that an offsets program that includes some incentives for afforestation could have the impact of taking some acreage out of production into forest production, but we do not have a number.

Senator JOHANNS. The offsets there that the Secretary speaks about would not go to the row crop person to offset his higher energy costs, his higher fertilizer costs, his higher other costs. It would go to the person who is planting the forest land.

But, again, unless you can quantify this, you cannot sell this plan because it becomes the hope and the prayer plan for agriculture, because you cannot tell farmers and ranchers what they are going to be exposed to in terms of their input costs, and that is a huge issue. And, that is what I am getting to here.

I said yesterday on the Senate floor it is no consolation to stand with one foot in the campfire, one foot in the ice bucket and say, on average, I am in good shape.

It is no consolation to say to farmers and ranchers, you are going to be in good shape on average, if you do not know the regional differences, if you do not know the crop differences, if you cannot tell them how much land is going to go out of production.

Yet, we have a House bill that was passed, and I find that shocking. I just find that amazingly shocking that that would have happened without that information being out there.

Mr. Chairman, thank you.

Chairman HARKIN. Thank you very much, Senator.

Now, Senator Roberts.

Well, I will go to Senator Cochran then if you are not ready.

Senator ROBERTS. You caught me off guard there, Mr. Chairman.

Thank you for your agreement that we hold additional hearings. Thank you for your agreement that we try to focus on some subjects that all of us will decide on when we have a meeting. I think that is real leadership, and I appreciate it Mr. Chairman, thank you very much.

Senators Bennet, Nelson, Thune, the county commissioner, mayor and Governor and Secretary and Senator Johanns and Senator Roberts, me, we are all High Plains drifters. We are out there on the high plains where it is pretty risky business, and we make a great crop 1 year, lose it two and hope for the best.

You have indicated that, well, if you are from coal country, and we are, 73 percent in Kansas. You drive long distances, and we sure as heck do that. And if we do not have any trees, last time I counted there were six in Dodge City.

[Laughter.]

Senator ROBERTS. I am making that up. We do have trees.

That somehow we are going to go to nuclear from coal. We have not built a nuclear plant in 30 years.

I think we are going to natural gas, which means higher fertilizer prices, and so that endangers the wheat, the corn, the sorghum and the soybean and even the cotton crops that we have and then puts a real dilemma in regards to the livestock producer and our rural communities. So that is just for starters in regards to the indexes that you have indicated.

Secretary Vilsack, it has been over 1 year since the Congress passed the Farm Bill. I know you are working hard on the implementation. I know our producers are anxious for the final rules and the decision to be made.

This bill gives you 1 year to establish the offsets allowances programs. I just think that is going to be a pretty heavy burden for you, if not an unrealistic task.

We know you do not have all the necessary resources for the SURE disaster program. I understand that has been done by pencil and paper and, hopefully, an eraser. If you do not have the software to implement this program, which we have a good idea of how it works, how are you going to implement this new carbon program that demands time and understanding?

Do you have the necessary resources to do this? Are you going to have to pull away from the Farm Bill and the disaster program to explain the warming cap and trade program?

Secretary VILSACK. Senator, I am confident that we will be able to get the work done.

You have alluded to the fact that we have an outdated, antiquated computer system, and we have requested resources to begin the process of modernizing that system. Our hope and prayer is that we can justify to you, the policymakers and the appropriators.

Senator ROBERTS. I will be very warm to that, and I appreciate the answer.

Administrator Jackson, EPA's cost analysis has taken a good deal of concern here. The EPA assumes 150 percent increase by 2015 in nuclear electricity production. I just mentioned that. I think this underestimates the amount of fuel switching by utilities, to move coal-based generation to natural gas. Obviously, as I have stated, in the High Plains, why, we are heavily dependent upon coal for our electricity, meaning our farmers are heavily dependent upon coal.

Now, since we have not had a new nuclear plant in 30 years, is it not more likely that many utilities will simply switch from coal to natural gas as opposed to building new nuclear plants and then

how is that going to affect farmers who need fertilizer to grow the crops that feed a troubled and hungry world? And, it is a whole bunch of crops.

Where is my chart or is this the one with the chart?

Ms. JACKSON. No, that is the other one.

Senator ROBERTS. Oh, there is the chart. This is a Kent Conrad special.

That is the nuclear production that you indicate is going to rise there. Stick your finger out there, right there.

I just do not think that is going to happen. I do not think it is going to happen. I wish it would, and I hope it would.

Any answer?

Ms. JACKSON. Yes, Senator. Thank you.

EPA did not assume nuclear power assumption. Rather, we projected that nuclear power would expand because of a rise in the carbon price. We constrained the ability of nuclear power production to grow any faster than the Energy Information Administration, which I see is also listed on your chart, has in its reference case. So we tried to adhere to what the Energy Information Administration says is likely to happen. So we did not look come up with that.

Senator ROBERTS. I understand that.

I am not going to ask the question by Saxby Chambliss that referred to India when he said no, and that per capita they release less CO2 than anybody else.

But I would sure be careful about any tariff punishment, more especially on China. We just heard from the former Fed Chairman, Mr. Greenspan, saying we might be at a tipping point with our economy, where he indicated that China might even buy our paper or our bonds—if that happens, higher interest rates.

I would be a little careful. As I said before, maybe Senator Smoot and Senator Hawley are for it, but I am not.

Finally, Administrator Jackson, I want you to come with me to a little town in Kansas called Treece. It is down there in the southeastern part. We can make a short walk across the street from Treece, a town in need of a buyout, into some place called Picher, Oklahoma, a town that received a buyout.

So, whenever your schedule allows you, we will show you a good time down there. We will get away from that toxic waste site. There is a lot of restaurants there, and you can take your pick, and we will have a good time.

If not, then at least the Region 7 Administrator who tends to be not less than cooperative but just a little stubborn or something. I am not quite sure what the problem is down there.

Secretary Vilsack, your testimony leaves out the impact of removing an estimated 40 million acres. That is the answer I think or that is the answer I have, Senator Johanns, and that is on the Farm Bureau estimate. I do not know if anybody is going to buy that. I am sure the Farm Bureau does—of pasture land to plant trees on the livestock industry.

Basically, I do not understand when you say there will be no impact of these decisions on livestock producers, and I think we have to have that answer, more especially in the High Plains.

You do not have to answer that. I think I am over time by 26 seconds, and that is pretty good.

No, I still have time left. Go ahead. You have 14 seconds.

Secretary VILSACK. Senator, I guess I approach this from a slightly different viewpoint about the capacity of American agriculture to innovate, and I appreciate that you may have some skepticism about that. But, based on history, what we have seen is the capacity of farmers and ranchers to adapt and to embrace technology and to be extraordinarily productive.

So, if one is suggesting that by virtue of taking pasture land out of production, that somehow that is going to substantially increase feed costs, that is an argument you can make. But I think you have to take into consideration: How will we adapt to that? What will we do in terms of feed technology? What will we do in terms of seed technology that might reduce inputs, that might increase productivity, that might allow us to produce exactly what we are producing today or more on less land?

Because the reality is that is in fact what has happened. We have produced more. We have significantly increased productivity in this Country.

Senator ROBERTS. Well, I think we have a pretty good record on that. I mean after several Farm Bills that many of us have worked on the productivity of the American farmer is incredible, and precision agriculture has been incredible. Matter of fact, we have been so incredible that production agriculture is sort of a forgotten miracle.

But 40 million acres out of production is significant. Do you agree with that number or not?

Secretary VILSACK. It may very well be the number that is in the estimate, but what I do not agree, and I do not want to belabor the point that I had with Senator Johanns.

The question is what land are we taking out of production? Are we taking land that currently is being used to produce crops or currently being used for grazing or are we taking out land that is significantly marginal and is not currently being used or is in conservation programs? That is the question.

I think what we are creating here are options. What we need in rural America in my view is as many income options as possible so that farmers have a chance of success and particularly those mid-sized farmers. You know if you look at the ag census what you are going to see is an increase in production agriculture, units of $500,000 in sales, 41,000 more units of farms in the last 5 years, 108,000 more farms in the smaller category of less than $10,000 in sales. Where we need options are those folks in the middle, and I think what this presents is the possibility of another income option.

Chairman HARKIN. Senator Roberts?

Senator ROBERTS. Yes, I know my time is up, and I thank you, Mr. Chairman. Just could I ask Administrator Jackson if she could just please come to Treece with me? It would just be——

Ms. JACKSON. I am happy to, Senator.

Senator ROBERTS. You will make every effort to come?

Ms. JACKSON. I will make every effort to come.

Senator ROBERTS. Yes, ma'am. Thank you so much.

Ms. JACKSON. Thank you.

Chairman HARKIN. Senator Cochran.

Senator COCHRAN. Mr. Chairman, thank you.

I have been sitting here for quite a while, so I have had an opportunity to read some of the statements which I found interesting.

I want to congratulate you, Mr. Chairman, for convening the hearing and getting our Committee to focus on the challenges, not only the traditional ones that we talk about, using agricultural products for energy production and some of the other alternatives that discussions like this always drive to consider.

I wanted to bring to the attention of the distinguished Assistant to the President for Science and Technology, John Holdren, that in our State of Mississippi, in Vicksburg, Mississippi, a few years ago, an entrepreneur family who had been in the oil and gas production business and in the distribution of product, transporting product in the traditional fossil fuel industries has now branched out and become active in the production of fuels from bioengineering experiences and trying to find new ways of creating usable energy products and delivering them at competitive prices.

I was fascinated by the success that this one company has had. I happen to be at the groundbreaking in Vicksburg several years ago and really had not thought much about that business until I got their annual report, and they are beginning to make money. But more than that, they have invented and are creating new ways of producing and distributing energy in our State and throughout the Southeastern Region.

This is the old Lampton-Love Company. Two families joined together to start the business. But they now have a high-tech name, and I cannot remember it. It is an acronym, two or three letters together, Inc.

But I am going to send you a copy of the annual report just to encourage you that leadership in the innovative approaches to dealing with older problems is being experience around our Country, I think. I think this is an indication of a new industry that gives us all hope for the future, that it is not all doom and gloom.

We do have challenges in the agricultural area, and I know you are interested in that too, but I think you might be interested in this.

But I want to thank the panel too for being here and helping us explore other issues that we need to be familiar with, so we can work in a cooperative way. This is not a partisan deal. We are all in this together. So we want to make sure that we have programs, government policies that encourage the successful operations of not only farms and agribusinesses but other energy companies as well, similar to the one I just mentioned.

Thanks for conducting the hearing, Mr. Chairman.

Chairman HARKIN. Thank you, Senator Cochran. I do not know if there are any responses from the panel to that or not.

We are expecting two stacked votes. If we can hurry, we will not have to come back then. So next would be Senator Thune.

Senator THUNE. Thank you, Mr. Chairman, and I want to thank you for holding today's hearing. I hope it is the first of many hearings that the Agriculture Committee conducts on climate change. If that kind of a law is enacted, a cap and trade program would

have sweeping implications for agriculture and for the entire economy.

I would say that in past years, when I have traveled across South Dakota, what I traditionally hear from agriculture producers has to deal with market and weather conditions. It has to do with USDA, price support, conservation programs, export opportunities, those sorts of things, the traditional topics of conversation that reflect the challenges of making a living in agriculture.

But today, it seems to me at least the attitude among farmers and ranchers has shifted dramatically, and it seems like the issues that they are bringing up have more to do with things that the government is doing that they think is making agriculture production more costly, less productive, less competitive. And, they are concerned about the cap and trade system proposal that they view would increase already high input costs for fertilizer and diesel fuel and electricity.

They are concerned about food safety laws that invite FDA inspectors onto their farms and ranchers.

They are worried about EPA studies that make ethanol look like a worse polluter than gasoline. They are worried about efforts to dramatically expand the Clean Water Act or regulate every ditch and puddle and stock dam and creek bed and stream on their land. And, they are worried about the EPA regulating greenhouse gases under the Clean Air Act and what that would mean for the future of production agriculture.

So, in a few short months, it seems to me at least that the government is being viewed more and more to folks in production agriculture as almost an adversary as opposed to an ally.

My view is that Congress and the Administration should be helping farmers and ranchers compete in a global marketplace and not hamstringing their everyday production decisions, and I hope as the Ag Committee moves forward with these issues that we will keep that very simple principle in mind.

Administrator Jackson, do you believe that increased renewable fuel production is better for our economy and our environment than relying on traditional gasoline made from imported oil?

Ms. JACKSON. Senator, I believe that renewable fuels by law, and that is what I am bound to implement. The Energy Independence and Security Act says that we should be moving toward renewable fuels and requires EPA to do certain rulemakings around that.

Senator THUNE. Will the EPA in its RFS2, final RFS2, limit that regulation to just domestic indirect land use changes when associated with renewable fuel production as opposed to international land use changes?

Ms. JACKSON. Senator, that regulation was out in draft. The public comment period has closed, and we are now in the middle of a peer review that is being conducted over the summer. We are waiting for the results of that peer review, and that will certainly also inform our decision—specifically the peer review, specifically on the issue you raise which is the international indirect land use implications of certain biofuels.

Senator THUNE. The other issue, and I guess I would ask this, and I do not know if this is contemplated in your rulemaking, but

will the EPA include in its RFS2 rule the indirect land use changes that are associated with increased oil production?

Ms. JACKSON. Yes, because they were already considered in the draft rulemaking. So, in looking at petroleum fuel, there was a look at indirect land use production with respect to international impacts there as well, Senator.

Senator THUNE. For petroleum?

Ms. JACKSON. Right. We applied the same kind of modeling to petroleum fuels that we did for renewable fuels.

Senator THUNE. OK. Well, I guess I would hope that, if in fact when the final ruling comes out. But if it does contemplate using international land use changes, Mr. Chairman, I would hope that this Committee would work toward making a change because that, to me, is not something that ought to be a part of any equation or calculation of the carbon footprint of renewable energy.

Secretary Vilsack, I am interested in the role that Federal forests can play in a safe and reliable source of renewable electricity and biofuel, and I am interested in your thoughts about what role Federal forests can play in the climate change policy and biofuels in terms of renewable energy production and energy security.

My question, I guess specifically, is do you believe that the Farm Bill definition of renewable biomass or the current RFS2 version of biomass is a better way to promote renewable energy?

Secretary VILSACK. Senator, we have obviously been supportive of the definition of biomass that the Senate and the House worked extensively on during the course of the Farm Bill discussions.

We know that on public lands the current House bill will allow for removal of trees and other materials except from national parks, but we also are working within the Recovery and Reinvestment Act to utilize opportunities in our forests for woody biomass demonstration projects to show the feasibility and opportunities. So a combination of those two programs, I think, will allow us to fully utilize our forests.

I would also say that we are looking at a strategic view relative to our forests that focuses on a comment that Senator Bennet made earlier, and that is maintaining them so that we make maximum use of their capacity to retain water and to improve the quality of water. So that requires us to look at maintenance a little bit differently, and that creates, I think, additional opportunities for supplying biofuel production from woody biomass and energy production from woody biomass.

Senator THUNE. There is a different definition in the Farm Bill, however, than exists in the Energy Bill which many of us have tried to rectify. The current definition in the Energy Bill and the RFS2 would preclude some of the areas of the Country that might participate in renewable fuel production, and the Black Hills of South Dakota comes to mind.

Now people in that area of the State are very much supportive of taking some of these forest residues and waste materials that generally contribute to fuel loads for fires in those forests and using them for a beneficial use which would be production of renewable energy.

So I guess what I would suggest, and I hope that before this process is completed that we will be able to get a biomass defini-

tion that is consistent with the one that we passed in the Farm Bill because I think that is the correct one. It makes it possible for many of these areas of the Country to participate in renewable fuel production. I guess I make that as an observation.

I mean your answer to me sounds like you are sort of more along the lines of the RFS2 and the Energy Bill definition. I know there have been various permutations of that as the process has moved forward, but right now all those definitions, with the exception of the one in the Farm Bill, preclude areas like the Black Hills of South Dakota from participating.

Secretary VILSACK. Senator, I guess if I might just suggest to you or indicate to you my thought about this, and I think we have been fairly consistent publicly about this. We think the Farm Bill definition of biomass is a good one.

Having said that depending upon what the policymakers decide, if you decide collectively to make a different decision on this as it relates to the Climate Change Bill, I still think that there are opportunities for the utilization of the woody biomass that can be created in the forests that you referred to. I think there are still opportunities within the energy title of the Farm Bill, within some of the recovery and reinvestment projects that are also being funded.

So I think there are still opportunities, and I think it will be part of how we maintain our forests properly in order to preserve water.

Chairman HARKIN. Thank you very much, Senator.

There are two votes now. The first vote was called at 4:14. I assume the first vote will be 15 minutes and the second vote, 10 minutes. They are back-to-back votes.

Senator LINCOLN IS NEXT. I am going to leave and go vote, but you are probably going to have to leave pretty soon too. Do you want to go vote and come back?

I am trying to figure out what to do here as we have two votes. If it was one vote, it would be easy.

Senator BROWN. I cannot come back.

Chairman HARKIN. Pardon?

Senator BROWN. I cannot come back. I have meetings about half an hour, 15 minutes from now. So, Senator Lincoln, it is her turn. So she can go.

Chairman HARKIN. Well, but she can——

Senator LINCOLN. I will be brief.

Chairman HARKIN. All right. Why do we not go ahead and you proceed?

Senator BROWN. I have just one.

Chairman HARKIN. Go ahead.

Senator LINCOLN. Yes, I will just throw mine out there.

Thank you, Mr. Chairman. We appreciate you and Senator Chambliss for bringing us here, and we do hope there will be more of those hearings.

We want to thank the panel. We are grateful to you for being here today, but we just need you to know we have to have you through this whole process in terms of coming through and really doing something that is meaningful but also something that is respectful of the economic conditions we are in right now and certainly from the different, diverse areas that we come from in this

Country. So we appreciate your all being here, and we look forward to working with you.

Just three questions basically: Secretary Vilsack, you have discussed that an agricultural offsets program will provide new revenue sources for agricultural producers across America. I guess my question, though, is do you believe that that will be the case for all agriculture producers?

As you well know, my State is a State that produces a tremendous amount of rice. They do it efficiently and effectively, and they feed the world. But many rice producers will see their input costs increase with no opportunity for mitigation on those costs. We would certainly rather have a rice field than a parking lot.

If you have any recommendations for mitigating cost increases for those producers that are ineligible for the ag offsets programs, I hope that you will express those to us either here today or in writing.

The other question I would have for you would be the USDA's analysis, which we got this morning. I have not had the opportunity to go through it thoroughly. But are there estimations of how many acres of cropland are going to be converted to forestry over the life of this bill and what are the impacts of those acreage shifts to the cost of grain and crops and particularly food prices?

That question has another second part to it which is we hear these questions over this debate and concerns about potential increases in the cost of fuel and the cost of electricity. We do not hear much about the potential increases in the cost of food and feed that may be indirectly impacted. I am certainly interested in the potential impact of climate legislation on food processing, the food processing industry which includes sectors that are important to us in Arkansas, whether it is poultry, meat, oil seed processing and others and would certainly like to have your comments on that and wondering if we would provide.

I mean there is going to be little assistance in the form of free mission allowances in the initial years of some of these programs. So I just worry if you have taken the kind of look at USDA at the potential impact of the House legislation on the food processing industry and the disproportionate cost on that industry that could really high, higher food prices in these difficult economic times.

Secretary VILSACK. Senator, let me see if I can quickly respond in light of the schedule here.

As far as rice is concerned, I think there are steps that rice producers can take to potentially qualify for offsets. Obviously, there are differences in terms of crops. Some people have more opportunities. Some people have less. Those who have less or those who have no opportunities, the bill that is currently before you does provide for additional allowances for those who cannot take advantage, to help them transition. So there is potentially some additional income source and opportunity from allowances for those who cannot participate.

That presupposes that innovation, presupposes that our knowledge stays static. That will not stay static. We will continue to innovate, and I think we will find a multitude of ways that we do not know of today to take full advantage of this.

As it relates to crops and trees, I think Senator Roberts said 40 million. I am not willing to concede that that necessarily will take cropland and will necessarily result in acre for acre reduction of feed and therefore increase costs for livestock producers.

The reason I am not willing to concede that is because this gives farmers a choice. They may decide to take unproductive land. They may decide to take land that is currently in conservation programs and utilize the offset opportunities that forestry may present. So I think there are options here.

As it relates to food processing, I do not know that we have done an evaluation of this, but I do know that the bill was designed and created in a way to try to provide for opportunities for energy-intensive industries to receive some sort of assistance and some sort of opportunity to transition to more efficiency and greater efficiency, which hopefully over time will lead to less input costs and hopefully be able to stabilize what we currently enjoy in this Country, which is relatively inexpensive food relative to other countries.

Senator LINCOLN. I would just say that these are problems that I think we have not fully addressed, and I hope that you will work with us to address these. They come as a big complication for our State and our population, also working with the Hunger Caucus here in the Senate, understanding difficult times, and the availability of food at reasonable prices is a critical issue.

Just to put on all of your minds, I hope, we have talked about early actors and the importance of what early actors have done. I hope that we will in some way adequately ensure that there is not an incentive for those owners to stop doing the good things that they have done.

I know my dad. I come from a rice farmer and a seventh-generation Arkansas rice farm family. I have never known a better conservationist than my dad, and I look around our State, and I see what farmers are doing, using the existing programs and others to really do the best job they can, whether it is clean water or whether it is conservation, planting trees and a whole host of other things.

So I hope we will disincentivize the good things that are happening, and I hope that all of you all will look at whenever we do push on these things sometimes we get unintended consequences.

So I look forward to working with you.

Thank you, Mr. Chairman.

Chairman HARKIN. Thank you very much, Senator Lincoln.

Senator BROWN. Can I have 30 seconds?

Chairman HARKIN. We have about 4 minutes left.

Senator BROWN. Oh, do we have it? OK. Thank you, Mr. Chairman.

We have how long left?

Chairman HARKIN. We have about 4 minutes.

Senator BROWN. I wanted to ask a question, and I will just submit it in writing to Secretary Vilsack.

First, welcome all three of you.

Chairman HARKIN. I will leave the record open for questions to be submitted in writing.

Senator BROWN. OK. I appreciate that.

I wanted to ask about the two major industries in my State are manufacturing and agriculture, and there are six major energy-intensive manufacturing nationally. All of them are in Ohio, and one of them is chemicals. I wanted to and I will put a question in writing about nitrogen fertilizer and the analysis that you are doing and its impact on climate change and on the legislation. So I will put that in writing and get it to, and I appreciate your thoughts on it.

Thanks.

Chairman HARKIN. I am sorry, Senator. I think by the time we go and come back, we have these two votes, and it is not fair to keep these people here for that. I apologize.

But we will submit these in writing. I would ask you to please respond as rapidly as possible. I will leave the record open for Senators who were not here, and, Senator Chambliss, I think, has some follow-up questions that he wanted to submit in writing in also.

Ms. JACKSON. Mr. Chairman, can I just correct the record? I gave an inaccuracy. The public comment on the renewable fuels rule has not closed. That is important to many of your constituencies. We extended it recently, so I just wanted to make sure I corrected the record on that.

Chairman HARKIN. I appreciate that very much.

I thank you all very much. It was a good exchange.

The Committee will stand adjourned.

[Whereupon, at 4:29 p.m., the Committee was adjourned.]

APPENDIX

JULY 22, 2009

Statement of Jason Grumet
President, Bipartisan Policy Center

Before the U.S. Senate Agriculture Committee

July 22, 2009

Chairman Harkin, Ranking Member Chambliss and members of the Senate Agriculture Committee, thank you for the opportunity to testify today. I am pleased to be here on behalf of Bipartisan Policy Center (BPC), which was founded by four former majority leaders, Senators Tom Daschle, Bob Dole, Howard Baker and George Mitchell. BPC was created to help provide the motivation and infrastructure to forge bipartisan consensus we believe is necessary for durable change. BPC hosts two active projects that bear directly on the Committee's inquiry here today.

The first initiative, the National Commission on Energy Policy (NCEP) was formed in 2001 to bring together a diverse group of stakeholder to address critical energy policy issues. NCEP has worked diligently to design climate policy solutions that address the legitimate concerns that business, organized labor and energy intensive industries like agriculture have about mandatory limits on greenhouse gas emissions. We believe that it is possible to design an effective economy-wide cap and trade program that encourages innovation and investment while limiting program costs harmful price volatility. In my testimony, I will be drawing upon the work of NCEP to identify opportunities to mitigate the concerns that agricultural producers have expressed about the increased costs of energy under a cap and trade regime.

The second initiative, the 21st Century Agricultural Policy Project, was led by former U.S. Senate Majority Leaders and long-time members of this committee, Senators Bob Dole and Tom Daschle. The 21st Century Agriculture Policy Project recognized that this rapidly changing economic landscape for agriculture calls for a more expansive and creative approach to national farm policy. In 2006 and 2007, the senators worked closely with farmers, ranchers, and other stakeholders to forge bipartisan consensus around a new agenda for U.S. farm policy in the 21st century. In 2007, Daschle and Dole released a report on the challenges and opportunities for agriculture in the transition toward a low carbon economy entitled "Competing and Succeeding in the 21st Century: New Markets for American Agriculture." The Senators concluded that a national cap and trade program could provide significant new market opportunities and additional income benefits to American agriculture.

The BPC believes strongly that action must be taken to address climate change and that urgency must take precedence over competing views of perfection. We recognize that farmers are highly-sophisticated when it comes to managing risk and do not suggest that the near-term risks of a changing climate justify actions that would imperil the basic economic proposition for domestic agriculture. At the same time, there is no question that left unchecked, climate change will compound the risks to U.S. and global agriculture. The BPC recently sponsored a study by a group of former military leaders about the national security challenges posed by climate change. These military leaders concluded that in the context of our national security, climate change is a "threat multiplier." I believe that the same is true for our agricultural and forest production. As

Bruce Babcock of Iowa State University recently wrote in his paper "Costs and Benefits to Agriculture from Climate Change Policy," (Iowa Ag Review, Summer 2009, Vol. 15, No. 3):

"Given the likelihood of modest costs and benefits from a cap and trade system, perhaps agriculture should look at whether a cap and trade policy will change growing conditions for the better or worse as a deciding factor in whether to support a change in policy. Given how much irrigated agriculture in the West relies on consistent snowfall and Corn Belt agriculture relies on warm summers and abundant rainfall, any disruptive change in the climate will have a far greater impact on livelihoods than will the price of carbon."

Most observers recognize that farmers, ranchers, and foresters can play a significant role in solving our climate problem. EPA and others estimate that improved agriculture and forestry prctices can mitigate significant portions of our national greenhouse gas output. At the same time, greenhouse gas offsets can generate a significant new income stream for American agriculture. Similarly, agriculture and rural landowners can play a critical role in the clean energy economy that would result from a cap and trade policy. Farmers can provide the nation with biofuels, wind power and biomass energy that could heat houses and provide electricity to millions of consumers across the country. The task before is us is to design an approach that enables a reasoned transition to a low carbon economy. For agriculture, this means ensuring that the costs of energy inputs remain reasonable and predictable while we create economic incentives that take full advantage of opportunities to sequester greenhouse gas emissions.

Controlling Costs in a Cap and Trade Program

NCEP's overall view of offsets is that they are invaluable and should be an integral part of a cap-and-trade approach. This view is informed by economic modeling of recent climate bills, which has shown that an offset program could significantly reduce the costs of a cap and trade program. But NCEP does not believe it is appropriate or realistic to rely on offsets as the primary mechanism for managing economic risk in the context of a mandatory climate policy. While the inclusion of offsets as an alternative compliance option gives emissions sources greater flexibility and can reduce short- and long-term costs, it also introduces an additional source of uncertainty since numerous difficult-to-predict administrative and environmental factors will affect the supply of offset credits and ultimately allowance prices. Thus, as discussed below, we believe that it is important to include additional economic risk management mechanisms that can provide greater assurances about the potential costs of a climate program.

Clearly, one of the most important and contentious issues being debated right now is how to keep the economic cost of mitigating greenhouse gases (for the agriculture sector) to a minimum. On the one hand, farmers, businesses, consumers, and workers need assurance that a cap-and-trade program won't result in excessively high costs or excessively volatile energy prices. At the same time, any successful program must have economic and environmental integrity—not only in the sense that it achieves its long-term emissions objectives, but also in the sense that it generates the meaningful and reasonably consistent financial incentives needed to initiate and sustain investment in new, low-carbon technologies over time.

With these goals in mind, the NCEP released a paper last week that recommended several improvements to the generally constructive cost containment approach taken in the House. The House bill contains provisions for a "strategic reserve" allowance auction that would make additional allowances available through an auction that begins at a specified price. Allowances for the reserve are borrowed from future years, thereby maintaining the integrity of the cumulative multi-year emissions cap while providing some price certainty in the near-term. The House bill also contains a price floor that will assure that there will always be a minimum level of investment in low and no carbon technologies.

An allowance reserve coupled with a price floor offers many of the benefits of a simple price cap and provides greater certainty about cumulative emissions reductions over the time horizon of the program. To be effective as a mechanism for managing economic risk, however, the allowance reserve must be structured to reduce uncertainty, not add to it. In our paper, we make several recommendations that would make this cost containment mechanism more predictable and effective. For example, we recommend changes to the way that the trigger price for the allowance reserve is set so that the price would rise over time in a transparent, pre-determined fashion (just as we would recommend for a straightforward price cap).

Overall, a price floor coupled with a price cap, or a robust, well-designed reserve auction mechanism could be extremely useful for increasing public confidence in the nascent greenhouse gas market. These mechanisms will limit volatility and will make allowance prices more predictable and transparent. In addition, a well designed cost containment mechanism can limit the risk that credit-trading will lead to the enrichment of Wall Street at the expense of Main Street. Importantly, a price collar can achieve this without imposing constraints on market activity that would undermine the pursuit of lowest-cost compliance and/or undermine necessary investment in low carbon technologies. Designing a reliable, reasonably simple, and effective approach to managing economic uncertainty *from the outset* will be critical to ensuring that a new U.S. climate policy achieves meaningful environmental results and commands broad support from policy makers, key stakeholders, and the American public.

In short, we believe that with modest but important revisions, the cost containment provisions of the House-passed climate and energy legislation can effectively reduce uncertainty over the economic impacts of climate legislation. It is also our view that simplifying and strengthening the cost-containment provisions in the House legislation is critical to building a bipartisan consensus for meaningful action this year.

Offset Program Design

How a climate change policy will affect agriculture will depend on the details in the final bill. Therefore, it is imperative that state and national agriculture organizations and their champions in Congress engage vigorously in the legislative process. During the negotiations over the recently-passed cap and trade legislation in the House, Agriculture Committee Chairman

Peterson worked out the details of the domestic offset program with Energy and Commerce Committee Chairman Waxman. Under the House-passed bill, the agriculture and forestry sectors are exempt from the bill's greenhouse gas emission reduction requirements. The USEPA will implement a carbon offset program and USDA will implement a separate agriculture and forestry offset program.

The question of which federal agency should administer a national carbon credit offset program has been hotly debated. The BPC applauds Chairmen Peterson's efforts to develop an approach that enjoys the support of the agricultural community. The BPC believes that it is critical that advocates for agriculture and the environmental community advocates to build a strong foundation of partnership and trust. USDA has a large national network of field offices, research facilities and expertise in agriculture and forest management. Moreover, USDA understands the farming culture. At the same time, an agricultural offset program must benefit from technical expertise available at EPA and by the ultimate certification of credits by EPA. In recent years some observers have expressed skepticism about the quality of offsets sold on the voluntary market. The reputation of these offsets must be unquestioned if they are to have long-term value in the marketplace. We encourage the Committee to consider approaches that will encourage and strengthen the partnership between USDA and EPA.

While not explicitly addressing the USDA vs. EPA issue, Senators Daschle and Dole released a report in 2008 that suggested a structure that might be a useful way to address the roles of USDA and EPA in a carbon offset program. Senators Daschle and Dole concluded that unlimited offset credits should be available for agriculture-based mitigation projects—including soil carbon sequestration projects—that can meet rigorous standards for assuring measurement, additionality, and permanence. At the same time, they recognized that it may take some time to design an efficient system to measure and credit the full range of offset activities. Sequestration activities – just like other technology advancements - - require innovation and experimentation. Even a small number of imperfectly documented offset credits could significantly undermine confidence in the emerging offset market. As a result, early market participants are likely to be highly risk adverse. There is every reason to expect continued controversy, critical media attention and a high degree of scrutiny by the Inspector General and other oversight bodies. This dynamic has the potential to stifle innovation and slow the learning that will be necessary to build the technical foundation and experience needed to realize the full potential of terrestrial sequestration.

To ensure that we move boldly to develop a robust offset market, Senators Daschle and Dole proposed the creation of an allowance "set aside" to reward agricultural sequestration *in addition to* an offset provision for these activities. By using emission permits to in essence "insure" new and innovative sequestration activities, it will be possible to create a more streamlined approach than under a traditional offset regime - - regardless of which Agency is running the program. Set-aside allowances taken from under the cap provide a particularly effective mechanism for rewarding projects that provide important carbon benefits, but that may have more difficulty meeting these tests, such as no-till practices undertaken long before the cap-and-trade program goes into effect (so-called 'early action' projects). This approach may be especially well suited to rewarding early actors in the agriculture sector for emissions reductions activities adopted prior

to implementation of the mandatory policy. The rationale is that it may be difficult to demonstrate "additionality" for some of these early reductions.

Rulemaking Under the Clean Air Act

The question before Congress is whether to create new programs that are specifically designed to cost-effectively reduce greenhouse gas emissions. In the absence of Congressional action, EPA will be compelled to move forward with imperfect tools under existing authority. The Supreme Court on April 2, 2007, in *Massachusetts v. EPA*, 549 U.S. 497 (2007), the Supreme Court found that greenhouse gases are air pollutants as defined in the Clean Air Act. The Court held that the EPA Administrator must determine whether or not greenhouse gas emissions from new motor vehicles cause or contribute to air pollution which may reasonably be anticipated to endanger public health or welfare. In April of 2009, the agency proposed a finding that carbon dioxide and five other greenhouse gases endanger public health and welfare. It is widely anticipated that EPA will move forward over the next two years to complete its endangerment finding and then draft regulations to reduce greenhouse gas emissions from a variety of sources. Between those two choices, it is far preferable for agricultural producers, and all Americans, to have a cap and trade program that provides opportunities for the generation and sale of offset credits.

Conclusion

While we can all agree that U.S. action alone cannot solve a global problem, it is equally true that we have no hope of securing effective and equitable global action absent U.S. leadership. The key is to design a program that protects our economy, strengthens our security and encourages innovation in both the production of low carbon energy and sequestration of carbon emissions. The BPC is greatly encouraged by this Committee's clear commitment to ensure that U.S. agriculture plays a critical role in the transition to a low-carbon economy and we look forward to doing whatever we can to support your deliberations in the coming weeks.

Statement of
Dr. John P. Holdren
Director, Office of Science and Technology Policy
Executive Office of the President
before the
Committee on Agriculture
United States Senate
Washington, D. C.
July 22, 2009

Thank you for the opportunity to testify at this important hearing. I will focus my testimony here on the science of the relation between global climate change, on the one hand, and agriculture and forestry, on the other.

Introduction

Climate is changing all across the globe. The air and the oceans are warming, mountain glaciers are disappearing, sea ice is shrinking, permafrost is thawing, and sea level is rising. And the consequences for human well-being are already being felt: more heat waves, floods, droughts, and wildfires; tropical diseases reaching into the temperate zones; vast areas of forest destroyed by pest outbreaks linked to warming; alterations in patterns of rainfall on which agriculture depends; and coastal property increasingly at risk from the surging seas.

We know the primary cause of these perils beyond any reasonable doubt. It is the emission of carbon dioxide (CO_2) and other heat-trapping pollutants from our factories, our vehicles, and our power plants, and from use of our land in ways that move carbon from soils and vegetation into the atmosphere in the form of CO_2 . We also know that failure to curb these emissions will bring far bigger impacts from global climate change in the future than those experienced so far. Devastating increases in the power of the strongest hurricanes, sharp drops in the productivity of farms and ocean fisheries, a dramatic acceleration of species extinctions, and inundation of low-lying areas by rising sea level are among the possible outcomes.

But we also know what we can and must do to avoid the worst of these possibilities. We can transform our technologies for supplying and using energy from polluting and wasteful to clean and efficient, using new incentives to accelerate the process and new agreements and forms of cooperation to bring the rest of the world along. We can halt and reverse deforestation, and we can modify farming practices in ways that increase rather than decrease the amounts of carbon stored in agricultural soils. Indeed, with care in choice of locations and methods, we can make our farms and our forests sustainable sources not only of food and fiber but of clean, renewable biofuels to help with the energy side of the solution. Finally, we can invest in countless ways to reduce our vulnerability to the changes in climate that we don't succeed in avoiding, for example by breeding heat- and drought-resistant crop strains, bolstering our defenses against tropical diseases, improving the efficiency of our water use, and starting to manage our coastal zones with sea-level rise in mind.

When we do all this, we will benefit not only by avoiding the worst damages from climate change, but also by reducing our perilous overdependence on petroleum, continuing to improve air quality in our cities, preserving our forests as havens for biodiversity and sources of sustainable livelihoods, reducing our vulnerability to the extreme weather events that occur from time to time even when climate is not changing overall, and generating new businesses, new jobs, and new growth in the course of getting it all done.

As is apparent already from the foregoing, the relation between farming and forestry and climate change is a multifaceted one. Farming and forestry practices are sources of some of the emissions that are driving global climate change, as well as points of particular vulnerability where climate change imperils human well-being by reducing the productivity of the land…and where adaptation efforts should be focused to reduce this harm. With appropriate management, on the other hand, farms and forests can become the locus of increased carbon storage that draws down the atmospheric load of CO_2, as well as serving as sources of low-carbon renewable biofuels. In what follows, I elaborate briefly on all of these aspects.

Vulnerability and adaptation of farms and forests under climate change

The conventional wisdom about effects of climate change on the productivity of farms and forests, up until a few years ago, was that modest increases in temperature accompanied by increases in atmospheric CO_2 (which is a plant nutrient as well as a heat-trapping pollutant) and rainfall (which increases in a warmer world because evaporation increases and what goes up must come down) would lead to increases in plant growth in many regions and thus to increases in crop yields and sustainable forest output. Only when the global average temperature increase reached 3.6 degrees Fahrenheit (2°C) or more above the pre-industrial value, it was thought, would the effects of heat stress on plants offset the beneficial effects of increased CO_2 and increased rainfall in enough places to lead to declines in farm and forest productivity on a global basis.

Recent improvements in understanding of plant physiology, the ecology of plant pests and pathogens, and the implications of changes in average temperatures for temperature extremes and for changes in the patterns of precipitation and evaporation -- all underpinned not just by theory and modeling but by observations – have changed this picture for the worse. It now seems that many plants are less helped by extra CO_2 and more hurt by heat stress than had been thought. In addition, increases in rainfall in a warming world come mainly in the form of an increase in deluges, a larger part of which rushes to the sea in storm runoff rather than soaking into the soil – a problem that's compounded by increased evaporation from the soil under increased heat. Thus drought conditions are expected to become more prevalent in a warming world, despite increased average rainfall and increased flooding.

Changes in atmospheric circulation patterns that are part of the climatic disruption driven by heat-trapping gases can make the situation even worse, as is already happening in India and China with changes in the monsoons on which agriculture in those countries is dependent. In those countries and many others where river flows are strongly affected by snowpack and the

timing of snowmelt – true of course across the western United States – reductions in the snowpack coupled with earlier snowmelt are reducing water availability in the growing season, compounding the problem of low soil moisture that arises from higher evaporation rates.

Left out entirely of most of the earlier projections of the impact of climate change on farms and forests, moreover, have been the effects of climate change on plant pests and pathogens. These generally do better under warmer conditions. (That is a major reason why agriculture in the tropics has always been more challenging – and generally less productive – than agriculture in the temperate zones.) A stunning example of this vulnerability is provided by the millions of acres of spruce and pine trees in Alaska, British Columbia, and Colorado that have been killed by the spruce budworm and the pine bark beetle, whose numbers soared in the warming environment while drought weakened the ability of the trees to resist them.

Increased prevalence of drought in a warming world is also increasing the incidence of wildfires, impacting not just forests and woodlands but the homes people have built in these places. The average annual area burned by wildfires in the western United States, for example, has increased about four-fold in the past 30 years, and property losses from these events have likewise risen as would be expected.

These impacts and stresses on farms and forests are not projections. They are already being experienced today, in a world that has warmed, on the average, only about 1.4 degrees Fahrenheit (0.8°C) compared to 1900. If global emissions of heat-trapping gases continue to grow on what is often termed a "business as usual" trajectory, mid-range estimates are that the global average surface temperature increase compared to 1900 will grow to around 3.6 degrees F (2°C) by 2050 and 5.4 to 7.2 degrees F (3-4°C) by 2100. Considerably greater increases in average temperature in this century cannot be ruled out, moreover, because of uncertainties about the strengths of "positive feedbacks" in the climate system (such as CO_2 releases from warming seas and soils). And whatever the global-average increases turn out to be, we know on solid scientific grounds that the increases in mid-continent will be typically 2 times bigger, and those at high latitudes in the Northern Hemisphere can be larger still.

Although it is still the case today that climate change has benefitted farms and forests in some places while harming them in others, and this mixed pattern may persist for some years more, there can be little doubt that the far larger temperature increases expected by 2030 and beyond on the "business as usual" trajectory would put substantial stresses on farms and forests in most places. Such stresses can be alleviated to some extent by adaptation efforts of a variety of kinds, of course, including development of heat-, drought, and pest/pathogen-resistant crop strains and more efficient water management schemes for agriculture. We absolutely need to make well focused and effective investments in such measures.

But adaptation becomes more difficult, more costly, and less effective the larger are the changes in climate to which one is trying to adapt. The need to restrain climate change to a level with which affordable adaptation measures can plausibly cope is what has led so many analysts of this problem to conclude that every effort should be made to avoid exceeding a global average

temperature increase of 3.6 degrees F (2°C). I note that President Obama's stated target for U.S. reductions in emissions of heat-trapping gases to 83% below 2005 emissions by 2050 is consistent with that aim, assuming that other industrialized countries perform similarly and that developing countries transition to declining emissions trajectories no more than a decade after the industrialized nations do.

Farms and forests as emitters and absorbers of heat-trapping gases

The Intergovernmental Panel on Climate Change (IPCC) estimated in its 2007 "Fourth Assessment" that human emissions of heat-trapping gases in 2004 were equivalent to about 50 billion metric tons of CO_2, of which 66% came from the energy sector and a bit over 30% from farms and forests. Carbon dioxide itself, which is by far the most important of the heat-trapping gases emitted by human activities, accounted for about three quarters of the CO_2-equivalent emissions, most of the rest coming from methane (CH_4) and nitrous oxide (N_2O) -- with a large part of the former coming from farm animals and a large part of the latter from the use of nitrogen fertilizer. Of the CO_2 contribution, around 75% is coming from fossil-fuel combustion and around 25% from deforestation, nearly all of the latter in the tropics.

For the United States, the EPA's *Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2007* shows croplands accounting in 2007 for about 6% of total CO2-equivalent greenhouse-gas emissions, mainly by generating 72 percent of the country's nitrous oxide emissions and 32 percent of its methane emissions. On the other hand, U.S. agricultural lands and forests are a large net absorber of carbon dioxide: the *Inventory* estimate is that growing vegetation in the United States removed about 1 billion tons of CO_2 from the atmosphere and stored it as plant material and soil organic matter. (This figure is equivalent to about 17 percent of current U.S. CO_2 emissions from fossil-fuel combustion.)

Continuing rises in temperature and atmospheric CO_2 concentration will affect the emission/absorption balance in vegetation and soil organic matter in complicated, sometimes offsetting, and still not well quantified ways. It is clear enough despite the uncertainties, however, that stopping and reversing deforestation in the tropics, increasing reforestation and afforestation rates elsewhere, and managing agricultural soils to maximize carbon storage can and must play an important role in national and global strategies for limiting the build-up of CO_2 in the atmosphere.

With respect to the methane and nitrous oxide emissions from agriculture, there are many practical measures available for reducing them. Farmers can change the rate, timing, and form of nitrogen fertilizer applications and can use nitrogen inhibitors to slow the release of nitrogen into the soil. Dairies and hog operations can employ anaerobic digesters and can compost or apply manure at appropriate levels instead of relying on open pits and lagoons. Cattle operations can use feeds that reduce methane emissions. These changes in technologies and practices could mean, in many instances, new jobs and economic opportunity in rural communities.

The IPCC's 2007 report estimated the potential for the emissions reductions available globally by 2030 in the agricultural sector as 0.6 billion to 6 billion tons of CO_2-equivalent per year, the quantity depending on how much society is willing to pay per ton. Reductions available from the forestry sector worldwide were similarly estimated to be between 1.3 billion and 14 billion tons of CO_2-equivalent per year. These figures may be compared with current global emissions of heat-trapping gases in the range of 50 billion tons of CO_2-equivalent per year.

The figures presented here make clear that the agricultural and forestry sectors are large enough both in terms of the emissions they are contributing to the global problem and in terms of the emissions reductions (or the equivalent in increased absorption) that they could contribute to the solution that national and international strategies for addressing the climate challenges definitely must include means for dealing with these sectors. The fossil-fuel sector in total is larger, but emissions reductions large enough to give a good chance of holding the global average temperature increase to less than 3.6 degrees F (2°C) are not practical without getting some of those reductions from reduced emissions and increased absorption in farms and forests.

Renewable biofuels from agriculture and forestry

Expanding the use of fuels derived from recently grown (as opposed to fossil) plant material – i.e., biomass fuels – is of particular interest both as a means of reducing dependence on imported oil and as a way to reduce emissions of carbon dioxide from the fuel sector. The latter potential benefit arises because the growth of plant material removes from the atmosphere exactly the same amount of CO_2 as is returned to the atmosphere when the material is burned. As long as growing the biomass feedstock does not entail significant CO_2 emissions from associated land-use change or use of fossil fuels in the provision of inputs such as fertilizer and irrigation water and as long as the processing and transport steps do not entail significant use of fossil fuels, biofuels can emit substantially less GHG emissions over their lifecycles than fossil fuels. If the use of renewably supplied biofuels for power generation is combined with CO_2 capture and sequestration, it is possible that the operation could be "carbon negative" – i.e., could produce a net reduction of CO_2 in the atmosphere.

In 2008, biomass fuels accounted for an estimated 10% of primary energy supply worldwide. (The fossil fuels – oil, coal, and natural gas – together accounted for 82%, nuclear energy for 5%, and hydro and other non-biomass renewables for 3%.) Almost 90 percent of the very substantial biomass contribution, however, was in the form of direct combustion of fuelwood, charcoal, crop wastes, and dung in low-efficiency, high-polluting stoves and fireplaces, mostly in the rural sectors of developing countries. Only about 12% of the biomass total – thus 1.2% of global primary energy – was in the form of ethanol (from corn and sugarcane), biodiesel (from a variety of feedstocks), and wood fed to electric power stations.

While currently modest against the yardstick of global fuel use, production of fuel ethanol and biodiesel is growing very rapidly. Fuel ethanol production went from about 8 billion gallons (30 billion liters) in 2004 to almost 18 billion gallons (67 billion liters) in 2008.

Biodiesel production rose from 530 million gallons (2 billion liters) to 3.2 billion gallons (12 billion liters) in the same period. Together these two biofuels were equivalent to just over 1% of world oil production in 2008.

In the United States, nearly 4 percent of primary energy supply came from biomass fuels in 2007, more than half of it in the form of wood and organic wastes used in combined heat-and-power (CHP) and pure-electric power plants and the rest in the form of liquid biofuels for transport and solid biomass fuels for residential and commercial heating. U.S. fuel ethanol production reached 9 billion gallons (34 billion liters) in 2008 – about half of the world's production – and U.S. biodiesel production reached 700 million gallons (2.6 billion liters). Together these liquid biofuels were equivalent to about 2.3% of U.S. petroleum use in that year.

The Energy Independence and Security Act of 2007 (EISA) requires a substantial increase in the volume of biofuels consumed in the United States, from 9 billion gallons in 2008 to 36 billion gallons by 2022, including 21 billion gallons of advanced biofuels (comprising 16 billion gallons of cellulosic ethanol, 4 billion gallons of "other" advanced biofuels, and at least 1 billion gallons of biomass-based diesel). EPA has estimated that this renewable fuel standard will reduce transportation-related GHG emissions by an average of 150-160 million tons of CO2 equivalent per year-- equivalent to the annual emissions of 23 to 24 million vehicles.

Science needs for supporting climate policy relating to agriculture and forestry

As indicated in the foregoing, the roles of farming and forestry in the climate-change challenge include the emissions of heat-trapping gases that now emanate from those sectors, the potential for reducing those emissions, the opportunities for increasing the uptake of CO_2 from the atmosphere by farms and forests, and the potential of biofuels to reduce and in some instances even make negative the net CO_2 emissions from vehicles and powerplants that otherwise would be burning fossil fuels. All of these roles are sufficiently well understood scientifically to support implementation of policies and activities in the U.S., and related international agreements, that will help us get from the farm and forest sectors the contributions needed from them if the challenge is to be met.

At the same time, continuing to improve our scientific understanding of the relevant processes, including especially our capacity to measure and monitor them quantitatively on local to regional scales will be valuable in (a) increasing confidence that the performance specified in policy and agreements is indeed being achieved, (b) developing improved understanding of the some of the currently less well researched options in the agricultural and forest sectors for both mitigation and adaptation, such as biochar and emissions from wetlands, and (c) using insights from (a) and (b) to help refine our policies in the decades ahead.. In the remainder of this testimony I elaborate on some aspects of (a) and (b), namely (i) measuring emissions and uptake in the agricultural and forest sectors and (ii) improving quantitative understanding of the emissions-reduction potential of biofuel options.

Assessing emissions and uptake

A variety of policies can be employed to take advantage of emission-reduction and carbon-storage opportunities in agriculture and forestry, including incentives, voluntary programs, education, and market-based programs such as offsets. Offsets, if properly designed, reduce the costs of implementing a cap-and-trade program and engage farmers and land-owners profitably in the national effort to reduce emissions. Doing this properly requires that quantification and reporting systems be rigorous, verifiable, and transparent; that review and auditing systems be effective; and that uncertainties be accounted for, managed, and reduced over time. Greenhouse gas benefits accrued through terrestrial carbon sequestration will need to be monitored according to standard practices to ensure that the offsets satisfy requirements related to permanence, leakage, additionality, and verifiability.[1] Meeting these requirements has been and remains the focus of a range of major U.S. government efforts, including the National Greenhouse Gas Inventory and project-based monitoring approaches developed by USDA and EPA, drawing on the work of governmental, private-sector, and academic researchers over the last two decades.

Achieving the high confidence that decision-makers and the public will want concerning offsets and the reality of emissions reductions or uptake increases claimed for other initiatives in the agriculture and forestry sectors will require continuing effort to improve our understanding of and ability to measure stocks and flows of carbon and nitrogen at global, regional, and local scales. Currently, "bottom up" methods are available for calculating emissions and uptake at scales from projects to nations. The ability to verify these calculations using independent observation systems needs more work in some instances, however, in part because our current observation networks for carbon fluxes do not have sufficient density of coverage spatially or resolving power temporally. A continuing effort to strengthen our observation network of ground-based, air-based, ocean-based, and space-based measurements of the carbon cycle is therefore highly desirable. Combined with existing capabilities in the form of facility and site-specific measurements, carbon-cycle modeling, fossil-fuel emission inventories, and data on land use, a more robust carbon-cycle observation network would offer valuable additional information about progress on reducing emissions and increasing uptake.

The Obama Administration recognizes the importance of continuing to improve our measurement and monitoring capabilities and is addressing this need through a variety of interagency efforts engaging USDA, Interior/USGS, Commerce/NOAA, EPA, and NASA, among others, with coordination and integration from OSTP, the National Science and Technology Council, and the U.S. Global Change Research Program (USGCRP).

---

[1] The issue of "permanence" refers to the potential reversibility of carbon sequestration; to be effective, the carbon that is removed from the atmosphere and stored in plants and soils through an offsets market must remain out of the atmosphere. "Leakage" refers to the shifting of emissions from one place to another at the local, regional, national , or international level. The requirement for "additionality" means that carbon offset credits should not be awarded for actions that would have been taken even without an offsets policy, i.e., in a business-as-usual case.

Understanding the emissions-reduction potential of biofuels options

The array of options for deriving additional energy supplies from biomass fuels is large. In addition to the corn ethanol, use of wood and biomass wastes for combined heat and power, and use of wood for home heating that dominate the U.S. biofuels picture today, these options include a variety of approaches for producing ethanol, diesel fuel, and jet fuel from cellulosic biomass sources; the use of natural or genetically engineered strains of algae as sources of liquid and gaseous fuels for transport, buildings, and industry and for solid fuel for electric-power generation; and novel approaches for using fast-growing cellulosic biomass sources to co-fire with coal in conventional and integrated gasification combined cycle (IGCC) electric power plants, potentially in combination with CO_2 capture and storage to an extent that could make such power generation a net absorber of CO_2 from the atmosphere.

These approaches differ in state of technological development, efficiency of the conversions of solar energy to plant material and plant material to end-use energy form, requirements for land and water and other inputs such as fertilizers and pesticides, cost, net benefit in reducing greenhouse-gas emissions when all inputs as well as influences on soil and vegetation where the material is grown and elsewhere are taken into account, and other environmental and social impacts (positive as well as negative). While much is known about these factors, the technologies are evolving and so is our understanding of their full range of characteristics. I believe we know enough to define appropriate metrics to help with choosing options and with regulation, but we will get better at it as our scientific understanding of the details improves.

The question of "direct" and "indirect" land-use and emissions impacts of different approaches to producing biomass for energy is particularly important and also scientifically challenging. ("Direct" impacts refer to those that occur on the sites where the biomass is grown, process, and used; "indirect" impacts are those that occur at other sites as a result of commodity price changes that ensue from the allocation of significant amounts of farm and forest lands to biomass energy production.) There can be little doubt that large increases in production of biofuels production will have effects on land use in the United States and the rest of the world; the real issue is the magnitude of this effect.

To the extent that reduction in crop production because of conversion of cropland to biofules production is compensated by increased food crop yields on other cropland the expansion of cultivated area will be moderated. The conversion of pasture and forest to cropland will also depend on regional, national and local land-use policies, price sensitivities, and the constraints imposed by competing agricultural uses, such asgrazing. EISA requires the EPA to examine this issue, and other aspects of a full life-cycle analysis of biofuels production, and to develop a methodology that accounts for all of the important factors. A reasonable first cut at this can be and is being made on the basis of current understandings, but one may expect that the further development of the underlying science will lead to improvements in the approach over time.

Conclusion

The agriculture and forest sectors are important components of the global climate-change challenge posed by the accumulation of heat-trapping gases in the atmosphere from human activities. The importance of these derives from their significant role as both emitters and absorbers of these gases, from the risks that greenhouse-gas-induced climate change poses to the productivity of our farms and the economic and ecological services derived from our forests (and corresponding needs and opportunities for adaptation as an indispensable route to reducing these risks), and from their potential for an expanded contribution from renewable biofuels to displace part of the fossil fuels whose combustion is the largest driver of the problem.

The science needed to understand these roles, risks, and opportunities is well enough in hand to enable crafting a set of policies and strategies to move the United States and, one hopes, other major agricultural and forest nations in the right directions in terms of both the mitigation and adaptation dimensions of including farms and forests in the solution to the climate-change challenge. It is important to tailor these policies to our capabilities and understandings in relation to specific agricultural and land-use practices, moving forward aggressively on the ones that are well understood as we continue to work to improve our understanding of those we know less well.

Continuing to strengthen the science base for policies and strategies in this domain going forward will bring significant rewards in terms of our confidence in the performance of the approaches that are put in place, the ability to improve those approaches over time, and the capacity to develop additional options for farm- and forest-based climate-change mitigation and adaptation for the future. OSTP is energetically engaged -- together with the full range of relevant cabinet departments, other federal agencies, and White House offices, and with our partners in the wider research community and the Congress – in ensuring that this happens. My colleagues in the White House and I look forward to working with this Committee and the rest of the Congress to this end.

Thank you for your attention. I will be pleased to try to answer any questions you may have.

Statement of Lisa P. Jackson
Administrator, U.S. Environmental Protection Agency
Hearing on:
The Role of Agriculture and Forestry in Global Warming Legislation
Committee on Agriculture, Nutrition, and Forestry
July 22, 2009

Chairman Harkin, Ranking Member Chambliss, and members of the Committee, thank you for inviting me to testify. It is a pleasure to appear alongside Secretary Vilsack and Dr. Holdren.

As you know, the President has called for legislation to decrease our dependence on oil, create millions of new jobs in clean-energy industries, and reduce the greenhouse-gas pollution that is already having visible impacts on our country. For all three of those goals, the President's call to action is as much about helping rural America as it is about helping urban America.

There are several ways to achieve these goals. For example, the clean-energy bill recently passed by the House includes a program to help American automakers produce and sell vehicles that are more fuel-efficient. That program goes beyond the light-duty cars used in cities and suburbs to include the trucks and non-road vehicles used in farm and ranch country.

The incentive structure of the House bill is designed to catapult American companies forward in the burgeoning global market for clean-energy technologies. Those American employers include not just the advanced battery manufacturer in Massachusetts and the solar-panel installation firm in Arizona. They also include the wind-tower manufacturer in Iowa, the bio-diesel processor in Ohio, and the bio-based insulation producer in Arkansas.

The U.S. Global Change Research Program (in its recently-released "Global Climate Change Impacts in the United States" publication) has reported the impacts that we would see in America over the course of this century if we allowed global warming to continue unchecked. Those impacts would not be limited to the urban coast of South Florida and the arid hills of Southern California. The Great Plains would likely experience more sustained droughts and increased infestations of insect pests better adapted to a warmer climate. The Southeast would likely experience declines in livestock production due to heat stress and more frequent and intense forest wildfires. The Midwest would likely experience reductions in water levels in the Great Lakes, more frequent spring flooding, and more severe summer drought.

So rural America is very much on the President's mind as he urges Congress to send him a bill that lessens our dependence on oil, creates high-paying jobs that cannot be sent overseas, and reduces the pollution that contributes to harmful climate change.

Getting America running on clean energy will require each of us to make a modest investment. For instance, EPA projects that if the bill recently passed by the House were enacted, then gasoline and diesel prices would be slightly higher in 2020 than under business as usual.

But the House-passed bill includes provisions designed to soften many of the cost impacts that worry farmers. For instance, the program described in the bill would distribute free emissions allowances to energy-intensive nitrogenous fertilizer manufacturers and wet corn millers. It also would direct the value of many allowances to propane consumers, such as the farmers who use it in drying corn.

Overall, EPA projects that the House-passed bill would entail an average annual per-household cost of between 22 and 30 cents a day over the life of the program. CBO projects 48 cents per day in 2020. The per-household impact would not be uniform across the country; the costs would be higher in states where people regularly drive long distances and rely almost exclusively on coal for electricity. But, as CBO has explained, those regional differences likely would be small. And even if the cost borne by the average household in a particular state were double the national average projected by CBO, it still would be less than a dollar a day in 2020.

The modest costs that farmers would bear likely would be exceeded by direct financial compensation for actions that qualify as offsets. Under the House-passed bill, American farmers, foresters, and ranchers would be the beneficiaries of a new, voluntary, free-enterprise program in which they could, if they chose, receive money for offsetting others' emissions by increasing carbon sequestration on their lands or reducing methane emissions from their operations. EPA projects that the offsets generated by American farmers, foresters, and ranchers in 2020 alone would have a market value of nearly 3 billion dollars that year, and that the amount would increase every year.

The U.S. government is in a good position to establish a robust, domestic offsets program. USDA has scientific expertise in greenhouse-gas management with croplands, rangelands, forests, and livestock. Since 1993, EPA has run the AgSTAR program, in which the agency's technical experts work with farmers to find opportunities to capture methane gas and put it to profitable use. And, through its Climate Leaders program, EPA has developed a series of offsets methodologies that have undergone extensive review and testing.

The development of an offsets market will require a full partnership between relevant federal agencies, including USDA, EPA, the Department of the Interior, and the Department of Energy. EPA looks forward to continuing and intensifying that partnership.

I thank this Committee for its constructive involvement and engagement with the agricultural community on this issue. I think your work will help ensure the success of legislation to get America running on clean energy.

Thank you again for inviting me here today. I look forward to answering your questions.

National Farmers Union
Testimony of Roger Johnson

Before the
U.S. Senate Committee on Agriculture,
Nutrition & Forestry

The Role of Agriculture and Forestry in
Global Warming Legislation

Wednesday, July 22, 2009
Washington, D.C.

STATEMENT OF ROGER JOHNSON, PRESIDENT
NATIONAL FARMERS UNION
BEFORE THE SENATE COMMITTEE ON AGRICULTURE,
NUTRITION AND FORESTRY
CONCERNING: THE ROLE OF AGRICULTURE AND FORESTRY
IN GLOBAL WARMING LEGISLATION
JULY 22, 2009

Chairman Harkin, Ranking Member Chambliss, and members of the committee, thank you for the opportunity to testify today. My name is Roger Johnson, and I am president of National Farmers Union (NFU). NFU was founded in 1902 in Point, Texas to help family farmers address profitability issues and monopolistic practices. Today, with a membership of 250,000 farm and ranch families, we continue our original mission to protect and enhance the economic well-being and quality of life for family farmers, ranchers and their rural communities. We believe that farmers and ranchers have a significant role to play in addressing the energy and environmental challenges facing our nation.

Today's hearing signifies a milestone for shaping the tone and role for agriculture moving forward with climate change legislation. NFU has been working proactively and constructively throughout the legislative debate to ensure our priorities and concerns are addressed. The American Clean Energy and Security Act (ACES) of 2009 as recently passed by the U.S. House of Representatives is a step in the right direction. The work of House Agriculture Committee Chairman Collin Peterson to establish a workable domestic agriculture and forestry offset program was a much needed improvement to the legislation, and NFU urged members of the House to vote in favor of ACES. In doing so, we hope to have demonstrated a constructive approach to pass legislation that works for American farmers, ranchers and rural communities.

The intersection of climate change mitigation and American agriculture is complex to navigate. It often requires access to a special dictionary to define words like additionality, permanence, early actors and leakage. NFU has emerged as a leading voice for how agriculture can play a significant role in combating global climate change. Our members were early to acknowledge the negative effects climate change has on domestic food, fuel and fiber production.

To address these issues, our policy supports a national, mandatory carbon emission cap and trade system to reduce non-farm greenhouse gas (GHG) emissions that:

- Grants the U.S. Department of Agriculture (USDA) control and administration of the agriculture offset program, rather than the Environmental Protection Agency (EPA);
- Does not place an artificial cap on domestic offset allowances;
- Bases carbon sequestration rates upon science;
- Recognizes early actors; and
- Allows producers to stack credits.

FINANCIAL IMPLICATIONS OF CLIMATE CHANGE

Although several policy options exist to address climate change, NFU believes the flexibility of a cap and trade program holds the most potential for actual GHG emissions reductions while mitigating increased energy costs resulting from such a program. A cap and trade system could provide farmers and ranchers the opportunity to be a part of the climate change solution by utilizing soil carbon sequestration and methane capture from certain livestock projects. These projects could be valuable revenue streams for producers who will experience increased input costs.

Failure to reduce GHG emissions poses significant economic impacts on agriculture and populations whose welfare is of special interest to the agricultural community. To state it simply, the cost of no action must become a legitimate part of the ongoing debate. Models of climate change scenarios demonstrate increased frequency of heat stress, droughts and flooding events that will reduce crop yield and livestock productivity. According to USDA, risk of crop failure will increase due to rising temperatures and variable rainfall. Further, earlier spring seasons and warmer winter temperatures will increase pathogen and parasite survival rates leading to disease concerns for crops and livestock.

On April 17, 2009 the EPA issued its "proposed endangerment finding" which concluded GHG emissions are a threat to public health. The report was in response to a 2007 U.S. Supreme Court ruling that ordered EPA to determine whether carbon dioxide and other GHG emissions qualify as pollutants under the Clean Air Act. It is understood that an endangerment finding under a single provision of the Clean Air Act cannot by itself trigger regulation under the entire Act. However, if Congress fails to pass climate change legislation, the EPA will move to regulate GHG emissions. A purely regulatory approach to addressing GHG emissions will bring all of the downsides of increased energy inputs without the upsides of carbon offset opportunities. For these reasons, NFU supports a comprehensive legislative approach to addressing climate change.

AGRICULTURE'S ROLE IN A CAP AND TRADE SYSTEM

NFU strongly believes that the agriculture and forestry sectors should not be subject to an emissions cap as they are too small and diffuse to be directly regulated. According to analysis completed by USDA and EPA in 2005, the country's two million farms and ranches emit minor quantities of GHG emissions, approximately seven percent of all U.S. emissions. Establishing a regulatory scheme to capture emissions from each of these farms would be extremely costly and burdensome and would likely fail to yield significant GHG emission reductions. Currently, EPA estimates that carbon sequestration by forests and agricultural lands offsets approximately 12 percent of annual GHG emissions with the capacity to offset 20 percent of GHG emissions from all sectors of the economy. A flexible offset program with appropriate financial incentives will accelerate sequestration practices under a cap and trade system. Carbon sequestration projects on agricultural and forestry lands are the easiest and most readily available means of reducing GHG emissions on a meaningful and expedited scale.

In April 2008, the Dole-Daschle 21st Century Agricultural Policy Project released a report, "The Role of Agriculture in Reducing Greenhouse Gas Emissions: Recommendations for a National Cap and Trade Program." The report cited EPA analysis that estimated up to 168 million tons of carbon dioxide could be sequestered in U.S. agricultural soils on an annual basis. The Dole-Daschle report went on to illustrate EPA's projection of total income opportunity associated with the estimates at a price per ton range consistent with current modeling estimates of carbon permit prices:

$10/ton CO2 = $1.17 billion/year
$15/ton CO2 = $2.5 billion/year
$20/ton CO2 = $3.4 billion /year

This income potential is significant to our members who will be faced with increased energy input costs. Energy-based GHG emissions related to the agricultural sector would be regulated upstream at the fuel supplier, electric utility or large industrial level. Our members accept that they will face increased energy costs; however, they do not agree with those who claim climate change legislation will be void of economic opportunities and incentives.

Mechanisms should be established that allow agriculture to generate offset credits by implementing practices to quickly reduce GHG emissions. Farmers and ranchers, who demonstrate GHG sequestration

and/or reduction, should be able to sell credits to regulated entities at a fair market price. In May 2008, under the leadership of Chairwoman Stabenow, the Senate Agriculture Subcommittee on Rural Revitalization, Conservation, Forestry and Credit held a hearing to investigate job creation and how agriculture and forestry can help lower costs in a low-carbon economy. I thank the subcommittee for taking action last year and renew NFU's pledge to working with Stabenow and all members of the Senate Agriculture Committee to ensure our mutual goals are met.

LEGISLATIVE PRIORITIES

USDA's Role

With more than 20 years of targeted climate change research, USDA is well positioned to promulgate rules and administer the agricultural offset program. USDA should be directed to promulgate regulations determining eligibility of agricultural and forestry offset projects and to administer related elements of such a program.

Currently, USDA maintains observation and data systems to monitor both changes in climatic patterns as well as beneficial practices to reduce GHG emissions and increase carbon sequestration. USDA has the institutional resources, administrative structure and established relationships with producers to launch and oversee an effective offset program. The 2008 Farm Bill provided the department with the statutory authority necessary to create and administer an offset program. USDA can leverage its experience working with farmers and ranchers to promote appropriate land based and manure management practices to drive maximum participation in the agricultural community. Agencies within USDA that have been working on agriculture sequestration projects include the Natural Resource Conservation Service; Cooperative State Research, Education, and Extension Service; Farm Service Agency, Economic Research Service; and Agricultural Research Service. Furthermore, for most farmers and ranchers in the country, USDA offices are located nearby.

Early Actors

Farmers, ranchers and landowners that already have entered into a voluntary, legally-binding contract and adopted certain practices to reduce GHG emissions should be allowed to participate under a federal mandatory cap and trade offset program. Often referred to as "early actors," these individuals are leaders who should be recognized and rewarded, rather than penalized and excluded. Some offset critics suggest early actors should not be compensated for carbon sequestered under a federal offset program. Such an argument, however, runs counter to the overall purpose of an offset program, which is to encourage widespread adoption of practices that reduce GHG emissions or sequester carbon. We believe that early actors who are generating offset credits under voluntary programs should be rewarded for any ton of carbon that is sequestered or destroyed, but has not been sold and used to meet a carbon reduction obligation. Additionally, it is critical that if an early actor meets and complies with all offset protocols for a practice, technique or project type under the new law, then he or she should be eligible for offset credits and paid for future GHG emissions reductions or sequestered carbon.

All existing rules-based and independently verified and registered tons implemented under current programs, such as the Chicago Climate Exchange (CCX), should be integrated into legislation to serve several important policy objectives. Specifically, incorporating existing verified and registered tons will prevent potential backsliding and continue to encourage agriculture offset projects while a federal program is being debated, enacted and implemented.

Unlimited Domestic Offsets

As I stated earlier, EPA estimates agricultural soils and forestry lands have the potential to sequester enough carbon to offset 20 percent of annual emissions in the United States. The goal is to remove as much GHG from the atmosphere as possible. Legislation should not artificially limit the amount of

domestic agricultural project offsets. ACES limits the total quantity to 2 billion tons, split between domestic and international offsets. Domestic agriculture and forestry projects alone have the potential to meet the limit, yet we do not know what other types of non-agricultural activities will qualify under the offset program. In order to aggressively address the impacts of climate change, there should be no limit on offsets, including those generated by agriculture and forestry, in order to provide the easiest, least costly and most readily available means to reduce GHG emissions on a meaningful scale.

Allowances

The distribution of emission allowances will be extremely important to the ultimate viability of a national cap and trade program. We believe the majority of emission allowances should be auctioned by the federal government with generated revenue used to mitigate the cost a cap and trade program would have on impacted parties and to foster the development of renewable, low-carbon energy sources and technologies. A portion of the allowances should be given away to critical sectors of the economy to reduce overall transition costs, as well as to provide economic incentives to drive further carbon reductions.

Providing a percentage of overall allowances, or a portion of allowance auction revenues, to the agricultural sector as proposed in the 2008 Lieberman-Warner climate change bill would offer flexibility for agriculture producers to implement activities that provide GHG benefits but may not technically fall within the scope of an offset program. In addition, producers have an extremely limited ability to pass higher costs along to purchasers. Establishing an allowance or allocation for agricultural producers will allow a smoother transition and readjustment to higher input costs resulting from the climate change legislation. Such funds would minimize the economic burden imposed upon the agricultural sector especially for smaller producers who are less able to generate offset credits. Specifically, the amount of credits that they could potentially generate may not warrant the cost of changing practices or the cost of compliance to verify the offset credits themselves.

The allocation of allowances or allowance revenues can allow research and development toward new seeds, technologies and techniques to increase production efficiency and counteract negative impacts of climate change. Farmers and ranchers are creative and innovative, yet federal funding will likely be vital to helping producers adapt to new techniques, practices and technologies for reducing GHG emissions and for sequestering carbon. The development of future methods of carbon sequestration or emission reductions could be encouraged and funded through allowance allocations or the proceeds of an allowance auction – allowances could in effect serve as a bridge as data is collected and verified. After being developed and implemented, new techniques and practices could potentially be certified as accredited offsets and would therefore no longer require funding from the allowance allocation.

ACES grants a 0.28% allocation of allowances to the agriculture sector. NFU believes the 5% allocation provided in the Lieberman-Warner bill debated in the Senate last year should serve as the minimum allocation for climate legislation.

Additionality

Defining additionality has proven to be a challenging and highly subjective task. The basic concept behind additionality is that a project or activity should receive credit under a cap and trade program to the extent it generates benefits that are in "addition" to what would have occurred absent the project. NFU supports the establishment of a static baseline of activity to measure against when determining additionality. The fixed baseline should institute what practices were being performed on a specific piece of land on a specific date; any activity that results in GHG emissions reductions measured against that baseline should be deemed eligible and additional. Defining this term has quickly become a slippery slope that threatens to limit participation under an offset program. Opponents argue projects would not be additional if a practice is common in a given geographic area, if the practice would have occurred due to a

pre-existing law or regulation or if the rationale behind implementing the action includes justifications beyond a cap and trade program. Each of these arguments creates a perverse definition of additionality that would exclude appropriate projects that offer real GHG emission reductions. At the end of the day, the atmosphere does not care why there is a reduction in GHG emissions, only that there is one.

Reversals

The establishment of an offset reserve pool to address potential reversals of carbon sequestration projects is prudent for the integrity of the program. However, the differentiation must be made between anthropogenic and non-anthropogenic (natural) emissions. The purpose of the cap and trade program is to reduce man-made/anthropogenic carbon emissions. Therefore, in establishing a reserve pool of offsets, participants should not be required to account for reversals caused by natural acts such as hurricanes, drought and wildfires. A key factor in the establishment of the reserve fund is who pays for such a system. NFU supports holding an individual responsible for intentionally reversing a carbon sequestration project. Under current Chicago Climate Exchange (CCX) protocols, twenty percent of a pool's credits are set aside in a reserve account for reversals. These credits may not be sold until the associated contracts expire and all conditions have been fulfilled. Penalties should be levied against enrollees who intentionally break their contracts and reverse a carbon sequestration project. Resolving the cost of unintentional reversals, however, should not be the burden of the offset provider.

Stackable Credits

The benefits accrued from a project established under a GHG offset market often provide additional environmental benefits including clean water, wildlife habitat and reduction of soil erosion. Sometimes these practices provide additional income to producers beyond the economic value of the offsets. Allowing offset project managers to "stack" credits will maximize the economic benefits to producers, encourage additional projects to be launched and amplify the environmental benefits accrued.

International Competitiveness

Since passage of ACES, the issue of international competitiveness has gained traction with regard to whether the United States will be at a significant disadvantage compared to other developing countries that have not instituted similar carbon constraints. NFU has long stood for trade agreements that are both free and fair and ensure proper environmental safeguards to guarantee a level playing field. It is critical that this legislation is enacted in such a way that ensures fairness with our international trading partners.

RENEWABLE ENERGY OPPORTUNITIES

NFU has long been a leader in supporting, finding and creating opportunities for all types of renewable energy; we continue to push for strengthening current technologies and industries, while helping usher in tomorrow's innovations. Rural America has the unprecedented opportunity to provide for the energy needs of the entire country, but cannot achieve that goal without a federal commitment that fully harnesses such potential.

As climate and energy legislation moves through the United States Senate, it is critical this opportunity is used to advance renewable energy opportunities in rural America. I will specifically mention two items.

First, the Senate should act similarly to the House of Representatives to ensure that the Renewable Fuels Standard is implemented in a common sense manner that will continue to drive development of petroleum alternatives. Specifically, the EPA should be barred from proceeding with the consideration of international indirect land use changes when calculating lifecycle GHG emissions for renewable fuels. Currently, there is no way to accurately predict how the production of biofuels will affect land use within the United States or on the international scene. Nor is it possible to fully capture the myriad other reasons for land use change around the world.

Additionally, NFU supports modification to the definition of renewable biomass to conform to the definition in the 2008 Farm Bill. The more inclusive farm bill definition ensures regional equity and allows for the responsible use of biomass from both private and federal lands that will ensure that we can meet the RFSII mandate. The farm bill definition reflects the thoughtful consultation of relevant agencies, including USDA, and other congressional committees.

Second, it is critical that any legislation include a robust Renewable Electricity Standard. Renewable electricity generation from rural America is a largely untapped resource. Study after study indicates that rural America has the potential to supply significant percentages of U.S. energy needs within the next two decades.

A 2003 Stanford University study found that wind resources capable of generating power competitively with new natural gas and coal powered plants blow across one-quarter of U.S. lands. The American Wind Energy Association estimates that economical wind resources are available in three-quarters of the states, and the Great Plains alone has potential in excess of current U.S. power generation. The United States Department of Agriculture and the Department of Energy have found that the United States has the capacity to produce nine billion tons of biomass from farmlands by 2030 that can be used for both electricity generation and cellulosic ethanol production.

Last July, NFU released a report on the economic benefits rural America would see if 20 percent of electricity consumed in the United States came from renewable sources. Electricity production from wind would result in rural landowners receiving between $475 million and $562 million in payments from wind farm leases. Electricity production from renewable biomass would result in payments of at least $25 billion to farmers of these new crops. And, $43.4-66.7 billion in capital would be invested in new clean energy facilities mostly in rural areas.

I want to take a moment to underscore that the type of projects also plays a critical role in how they benefit rural America. A National Renewable Energy Laboratory (NREL) study compared the benefits of local ownership versus outside ownership, and found that locally-owned wind projects generate 2.6 times more jobs and 3.1 times more rural economic benefit than those with outside ownership. Echoing this point, a 2006 study by Oregon State University concluded that local ownership of wind turbines would result in five times the annual projected income versus entering into a land lease agreement. Given this fact, NFU believes that federal policies should foster the development of locally-owned projects.

FARMERS UNION CARBON CREDIT PROGRAM

Upon meeting all eligibility requirements, Farmers Union became a CCX aggregator in early 2006. The organization became involved with the goal of enhancing farm income through economically successful and environmentally sound land management practices that reduce or offset carbon emissions. Initially launched in North Dakota, the Farmers Union Carbon Credit Program was expanded in the fall of 2006.

CCX is North America's only, and the world's first, GHG emission registry, reduction and trading system for all six greenhouse gases. Members of CCX make a voluntary, legally binding commitment to reduce GHG emissions. Many Fortune 500 companies, multinational corporations, utility and power generation companies and municipalities are purchasing CCX carbon credits for a variety of reasons. Some buy credits to boost public relations, while others have subsidiaries based in foreign countries and are obligated to reduce emissions or buy offset credits per obligations under the Kyoto Treaty. Still others are simply concerned about the environment and want to reduce GHG emissions.

The CCX program has developed standardized trading instruments and workable protocols for aggregation, registration, verification and sale of agricultural and forestry offsets. Currently, NFU is the largest aggregator of agriculture carbon credits on CCX. To date more than 5 million acres are enrolled across 31 states and nearly $9.5 million has been earned for the almost 4,000 producers that are voluntarily participating in our program. NFU has learned valuable lessons on how to properly construct an offset program. Attached to my testimony is a state-by-state summary of the acres enrolled in each eligible category.

Eligible practices under the Farmers Union Carbon Credit Program include no-till crop management, conversion of cropland to grassland and sustainable management of native rangelands; forestry; and agricultural methane. Chapter 9 of the CCX Rulebook relates to offsets and early action credits and outlines detailed protocols. As an aggregator, it is our job to translate technical requirements into easily understood project obligations and communicate that information to producers. We believe the protocols and methodologies within CCX can serve as a starting point for a federally mandated offset program administered by USDA.

Enrollment Process

An interested producer can log onto *www.carboncredit.ndfu.org* to enroll in the Farmers Union Carbon Credit Program. Currently, the website utilizes a map-based enrollment method for the nine Midwestern states, Wisconsin, Minnesota, North Dakota, South Dakota, Nebraska, Kansas, Colorado, Wyoming and Montana (a 48-state map will be launched by the end of this summer). Upon creation of an account, the producer selects the appropriate contract(s) and adds acres by selecting the appropriate parcels on a digital map. Required information, such as farm and tract numbers are inputted to allow the system to automatically calculate total acreage. The producer can continue to add parcels until all acreage he or she wishes to enroll has been selected. Contracts are then printed, signed and returned for enrollment.

Verification

CCX protocols require a minimum random sample of 10 percent of contracts and enrolled acres be verified on an annual basis. The sample must include a minimum of 10 percent of contracts representing 10 percent of acres in order to prevent a single, large enrollee from skewing results. The Farmers Union Carbon Credit Program actual verification sample is generally closer to 15 percent of all contracts and enrolled acres. The verification process is conducted by CCX–approved third-party vendors. The North Dakota Association of Soil Conservation Districts, Association of Official Seed Certifying Agencies, AgriWaste Technology, Inc., SES Inc and Winrock International have conducted audits under the Farmers Union program.

Since the beginning of our program, we have not found the verification costs or process to be a deterrent to producer participation.

Confidentiality

As a private enterprise, all contracts and supporting documentation are kept confidential by the Farmers Union Carbon Credit Program. In order to complete the verification process, approved third-party verifiers are provided copies of necessary documents for the sole purpose of program compliance confirmation. Verifiers are legally bound to protect producers' information. Further, as an aggregator, we must submit limited information - enrollee's name, contact information and acreage totals, to CCX when requesting credits be registered on the exchange.

CONCLUSION

I recently had the opportunity to participate in one of the stops on USDA's rural tour. I was encouraged by the enthusiasm that exists in rural America for ways in which farmers and ranchers can be part of the

climate change solution. Since passage of ACES, regional and national press has focused its efforts on negative scenarios for agriculture under a cap and trade system. I believe as the leader of a national organization, it is my responsibility to help change the conversation about this legislation.

Today is an opportunity to emphasize that America's farmers and ranchers can be, and want to be, part of the solution to global climate change.

Enacting legislation to address global climate change will be one of the most significant challenges and opportunities for this Congress to undertake. Balancing environmental goals with consumer and economic impacts will be difficult. Yet, the chorus of those calling for action continues to get louder. While my testimony aims to detail the role of aggregators and opportunities for agricultural producers to participate in an offset program as well as highlight some of the policy priorities for NFU in the climate change debate, there is no question other issues and concerns will arise. As an organization that has been around for more than 100 years, we stand ready to help Congress accomplish one of the most significant policy challenges facing our country today. I look forward to answering any questions committee members may have. Thank you.

Farmers Union Carbon Credit Program
Acreage Enrollment Totals

State	No-Till	New Grass	Forestry	Rangeland
AR	0	0	1,740	0
CO	50,802	80,145	2	262,031
GA	218	0	314	0
IA	4,456	355	0	0
ID	0	0	0	18,109
IL	10,285	433	131	0
IN	52,635	1,105	235	0
KS	103,367	8,465	0	9,432
KY	4,476	128	0	0
MD	4,634	521	0	0
MI	3,434	205	0	0
MN	10,458	39,901	789	0
MO	24,254	4,584	168	0
MT	239,517	54,708	0	297,933
ND	1,386,746	69,416	81	212,515
NE	232,230	27,246	193	878,361
NJ	0	0	19	0
NM	0	0	0	40,712
NY	236	63	254	0
OH	43,939	1,547	220	0
OK	3,747	670	0	15,917
OR	0	1,402	0	0
PA	1,837	217	0	0
SC	141	0	0	0
SD	528,828	33,566	443	314,026
TN	6,432	693	125	0
TX	1,527	411	0	0
VA	3,785	911	514	0
WA	0	1,648	0	0
WI	19,714	3,065	1,086	0
WY	3,063	3,222	0	220.652
Total	**2,740,761**	**334,627**	**6,314**	**2,269,688**

Updated: June 9, 2

Statement of Josiah Pierce
Family Forest Owner
On Behalf of the
American Forest Foundation
and the
Forest Climate Working Group
Before the Senate Agriculture Committee Regarding
"The Role of Agriculture and Forestry in Global Warming Legislation"
July 22, 2009

Mr. Chairman, Ranking Member Chambliss, members of the Committee, thank you for the opportunity to appear before you today as a family forest owner, a leader in the American Tree Farm System which is a program of the American Forest Foundation, and as a representative of the Forest-Climate Working Group.

There is one fact that I hope is on all of your minds as you craft climate legislation: Today, U.S. forests sequester and store 10% of our annual U.S. carbon emissions. The U.S. Environmental Protection Agency (EPA) estimates that we can double this to 20%, providing one-fifth of the nation's climate solution, if the right markets and incentives are in place. This is a solution that is right here in our backyards that we can put to work today.

What's important here is that the ***RIGHT*** incentives and markets need to be put in place to fully capture this climate mitigation potential of U.S. forests.

Most of America's forests are privately owned and most of these privately owned forests are owned by the small guys, families like ours. There are 10 million private forest owners in the U.S. Analysis by the EPA suggests that these private forest lands will supply the vast majority of the carbon offsets that are expected to be available for purchase by emitters to reduce their carbon emissions. If we are going to meet our nation's climate goals, we must fully engage the private forest sector through federal climate legislation that provides economic incentives for America's forest landowners to capture and store carbon on their land.

Creating these incentives is about more than reducing carbon in the atmosphere. It is a critically important "green jobs" opportunity that will put rural America to work, harvesting carbon from the atmosphere. If climate legislation is structured appropriately, carbon sequestration and storage can create needed income streams for family forest owners like me, helping to keep families on the land and keep jobs and strong economies in rural communities.

My wife and I own 2,000 acres of forest land in Maine which includes about 35 acres of farmland. We are both farmers and forestland owners, and while we probably spend more time farming, we generate more income from our forestry activities. Since 1961 my family property has been certified as sustainable under the American Tree Farm System®. We are one of over 91,000 members of this System, including Senator Leahy,

Senator Lugar, and several other Senators and Members of the House. As a member of the Tree Farm System, we agree to manage our land for current and future generations, ensuring environmental protection while generating income for our family.

I'm the sixth generation owner of my family property. We've managed for a variety of purposes including timber income and recreation throughout the centuries. We also have a strong focus on wildlife. I've partnered with both federal and state agencies to develop wildlife conservation programs that work for family forest owners.

As a family forest owner, our goal is to keep the land in forest for both the income benefits but also for the many environmental and economic benefits to surrounding communities. Our forest provides community amenities like clean water and air, wildlife habitat, scenic beauty that supports tourism, and wood products that support thousands of local jobs. And frankly, we love our land.

Forestry is like many other ways to earn a living from the land—it has changing variables and constant challenges. The smartest thing any family forest owner can do is to diversify income streams so that if one variable changes, such as the market price of a certain kind of timber, that landowner will have other income streams to rely on. We are constantly looking for these kinds of opportunities to help our family stay on the land doing the work we love.

The fiscal reality of forest ownership today is harsh, with no immediate signs of improvement. Traditional timber markets have declined due to the economic downturn and housing market crash, as well as with the gradual shifting of domestic wood products manufacturing to overseas. With these declines family forest owners have seen markets and income opportunities decline significantly. As timber markets have declined, we've also seen increased pressure to sell land for development. Annually, an area of forest about the size of the state of Delaware is converted to development, lost forever as a carbon sink and as a source of environmental and community amenities. Without income streams to keep families on the land, we risk losing this incredibly valuable national asset and local resource base.

Climate legislation could help counter this trend by creating new market opportunities for family forest owners like me to sell our carbon storage to emitters, helping to solve the climate problem while also encouraging more family forest owners to manage sustainably and conserve their land.

Family forest owners are not alone in seeing this opportunity. I'm also here today to share the views of the Forest-Climate Working Group. This is a diverse group of forest landowner, conservation, forest industry, and carbon finance organizations, which have come together around common recommendations for the current climate legislation. This group has worked together for almost two years to develop consensus proposals for how forests can be included in climate legislation as a highly effective tool for both reducing greenhouse gases and creating new economic activity in rural communities.

This diverse group has one key commonality: we all believe that U.S. private forests have a significant role to play in addressing climate change, so we all want to see climate legislation establish markets and other incentives for U.S. private forests to capture this mitigation potential.

There are three ways the climate bill can ensure that U.S. private forests can meet the 20% emissions reduction goal mentioned earlier:

First, the bill must set up workable, environmentally sound, offset markets for private forest owners. Offsets markets should require real, permanent, additional, and verifiable offsets while still maintaining flexibility that enables broad forest landowner participation. Forest offset markets are an important element in a cap and trade system, because they help reduce emissions as well as reduce the cost of the system. EPA estimates that under the Waxman-Markey bill, U.S. forests will supply roughly 80% of the domestic offsets, and that without forest offsets the costs of the bill would skyrocket. Because of this heavy reliance on forest offsets, we must be sure that the market is set up to allow participation of the broad range of private forest owners who collectively own the bulk of the forests in the U.S. and will be called upon to supply the majority of domestic offsets.

Secondly, the bill must provide supplemental carbon incentives to help engage forest owners who aren't able to participate in offset markets. Not all private forest owners will be able to, or wish to, participate in offset markets, but their participation in carbon sequestering practices is vital when it comes to reducing emissions in the atmosphere. Recent pilot projects conducted by the American Forest Foundation have shown that small family forest owners who own less than 100 acres will have a difficult time entering offset markets because the entry costs and ongoing transaction costs will likely outweigh the return. Roughly one-quarter of the private forest land base in the U.S. is in small tracts of 100 acres or less. Climate legislation should establish a program-based approach outside of offset markets to capture the climate mitigation potential from these forests. As part of such a programmatic approach, we must clearly specify goals and direction for these incentive-driven carbon activities, to ensure that we fully and efficiently capture the climate benefits of these forests.

Lastly, the bill must provide resources for forest adaptation activities to ensure that the climate mitigation tool we have in our forested backyard is not overtaken with the impacts of climate change, like drought, fires, pathogens, and pests. Forest owners nationwide are already seeing and adjusting management to adapt to a changing climate and associated impacts, whether from heightened pests like the mountain pine beetle in the West or changed climatic conditions that complicate forest management. Sugarmakers in southern Vermont, for example, are now sugaring as much as a month earlier than historical average as a result of shorter and milder winters and must manage forests differently to account for the rapid incursion of the invasive species, barberry, which quickly colonizes heavily cut areas.

Detailed Recommendations for Climate Legislation

Expanding on the points above, below are recommendations for making climate legislation work for private forests:

Establish workable, environmentally sound, offset markets. Federal offset markets must be structured to achieve rigorous environmental performance while simultaneously encouraging and facilitating participation from the forest community. The following are important elements of offset markets.

- **Specify Critical Details of Project Eligibility:** We support inclusion of a specific list of eligible project types for forestry, as provided in the House bill. This will assure that key project types such as improved forest management with appropriate crediting for harvested wood products are included in a federal offset program. EPA research has shown that this project type will be uniquely important to assure adequate supply of high quality offsets.

- **Ensure a Vigorous Offsets Program at the Outset of Cap and Trade:** For a comprehensive cap and trade system to be successful, a vigorous offset program must be online at the outset and able to get projects moving quickly. The House bill specifies that offset markets should be established within one year from enactment—what we believe to be an appropriate period. However, the House bill provides a 90-day period for agency review and approval of offset projects and crediting of verified emissions. We believe that this should be reduced to 60 days or less to avoid unnecessary delay in getting projects moving and credited.

- **Provide Flexibility for Offset Producers:** We feel that in order to develop a robust market, carbon offset producers should have some flexibility in designing projects. To help support this flexibility, legislation should specify that offset producers who make intentional reversals may terminate an offset project as long as that producer has made full replacement of lost reductions. We also believe that allowing market flexibility for landowners and project developers to establish forest carbon contracts of different duration in response to market demand would be appropriate, provided that the environmental integrity of emissions reductions is not compromised. Clear rules should be established for replacing shorter-term credits so that environmental integrity is maintained, and contracts of varying duration should be standardized to allow them to remain fungible in offset markets.

- **Automatic reenrollment for subsequent crediting periods:** Section 504 provides that forest sequestration projects will be assigned 20-year offset crediting periods, with the possibility of subsequent renewals. Because most forest offset projects will be designed to generate credits over longer periods, it will be critical to bring greater certainty at the outset of a project that offsets will be available during the life of the project. To achieve this, legislation should specify that subsequent renewals for new crediting periods will be approved absent a clear demonstration from the Secretary that the project has not been implemented

consistent with its original criteria or otherwise fails to conform with federal offset market guidelines as of the date of reapplication.

- **Early Action Reductions Should Be Recognized:** Many of our organizations have invested significantly in early action reductions and sequestration projects. We recommend that these important contributions toward addressing climate change should be used to bridge the gap between implementation of the cap and when offsets under the legislation become available. The House-passed bill took important steps to assure that early action projects developed under other compliance and voluntary systems are recognized, with additional potential for "readily reversible" reductions not registered under any offset market to be credited. We encourage the Senate to be as clear as possible in specifying that a wide range of early action projects, including those under voluntary markets, should be eligible if they meet the criteria of federal offset markets. We further recommend that the Senate clarify that a full range of early action projects not able to meet these tests, including forest projects, should be eligible to receive discounted payment as compensation consistent with Section 795 of the House bill.

Create carbon incentives to capture carbon from private forests that don't fit in offset markets. Forest owners will be able to participate broadly in offset markets with the legislative changes recommended above. However, some owners might not be able to participate, because the costs of measuring, monitoring, and verification will be too high for smaller forest owners. Further, we recognize that some valuable project types will need additional data and field testing to qualify for offset markets. A supplemental incentives program run by USDA will give us the ability to reach beyond what can be accomplished through offset markets to capture further reductions and establish an engine for developing future offset supply. An incentive program can be up and running very quickly, to provide early reductions even before offset markets can be fully established. Given the high likelihood of a lengthy and complex rulemaking process for offsets, this program can be a frontrunner for the offsets program as a whole.

The Pingree amendment offered in the House, but unfortunately not included in the final House bill, featured the kind of structure and focus that we believe would be most appropriate for a forest carbon supplemental incentives program. Several elements of the Pingree amendment are critical to an effective forest carbon incentives program including:

Flexible Practice-Based Methods for Supplemental Incentives: Reductions achieved through supplemental incentives do not create new emissions rights for covered entities and should not have to meet the same rigorous measurement or permanence standards of offsets. This flexibility should be utilized by USDA to develop practice-based tests for awarding supplemental incentives, with payment according to the acreage upon which a given practice is employed and the estimated carbon value of each practice.

Incentives for Avoided Conversion: Supplemental incentives should also be used to help avoid conversion of forests, including term agreements as part of incentive contracts and permanent conservation easements. This will help assure that carbon gains achieved through supplemental incentive practices are carried into the future and that the capacity for future reductions is maintained.

Provide resources for forest adaptation to ensure that forests can continue to serve as a climate solution, in the face of climate change impacts. Forests are a non-negotiable component of our climate strategy—we must build from current forest sequestration levels if we have any chance of addressing climate change. However, forests are also central to our economy and security in other ways. Forests provide water for 180 million Americans each day, shelter much of our critical fish and wildlife habitat, and generate critical economic activity during this time of economic stress. All of these values will be at risk if we cannot effectively manage the rising threats to forests from pests, disease, drought, extreme weather, and other climate-driven stressors. Congress must provide the appropriate tools to agencies and landowners for adaptive management and strategic conservation of key forest resource areas, including:

- **State and Private Forestry Resources in Any Adaptation Response:** The House-passed bill included a great improvement, expanding the natural resources adaptation provisions beyond early drafts to include a role for U.S. Forest Service State and Private Forestry. Our state forestry agencies are the key players on the ground in each state positioned to work with private landowners to address the adaptation challenges to come. This role should be maintained in the legislation.

- **Expand the Range of Forest Tools:** The natural resources adaptation package in the House-passed bill includes many valuable tools for agencies and landowners to address forest adaptation challenges. However, the range of tools for forest activities should be diversified to better include the kinds of cost-share and incentive programs that could be used to help private landowners address specific adaptation projects, such as invasive species eradication.

In conclusion, U.S. forests have a lot to offer when it comes to climate change mitigation—our forests can supply 20% of the solution. As you craft climate legislation, I urge you to ensure that the bill fully captures this potential with environmentally sound offset markets that work for forest owners, with supplemental incentives for carbon friendly activities in forests, and with resources to help ensure we can adapt our forest management in a changing climate.

Statement of the American Farm Bureau Federation

To: Senate Committee on Agriculture, Nutrition and Forestry

"The Role of Agriculture in Global Warming Legislation"

July 22, 2009

Presented by Bob Stallman
President, American Farm Bureau Federation

600 Maryland Ave. SW | Suite 1000W | Washington, DC 20024 | p. 202.406.3600 | f. 202.406.3606 | www.fb.org

My name is Bob Stallman. I am President of the American Farm Bureau Federation and a rice and cattle producer from Columbus, Texas. Farm Bureau is the nation's largest general farm organization, representing producers of every commodity, in every state of the nation as well as Puerto Rico, with over 6 million member families. I appreciate the invitation to address the committee this morning on an issue that has generated tremendous debate within our organization.

As we have looked at this issue, we have tried to stay grounded in facts, and as someone once said, facts are stubborn things. We also believe very strongly that this issue, like others, ought to be grounded in sound science.

What do the facts and the science tell us about climate change?

Number one, data seems to clearly indicate an identifiable warming trend. The data also shows that carbon dioxide concentrations in the atmosphere are increasing and that man-made emissions have increased for a number of decades.

But those aren't the only facts, and they don't tell the whole story. We also know, for instance, that the climate models that have gotten so much attention did not predict the cooling that has occurred over the last decade. We know that there have been times in the earth's history when carbon concentrations in the atmosphere were greater, when temperatures have been cooler or warmer – in short, there are any number of variables that probably affect the earth's climate in ways that we simply don't know and can't predict. We know that reputable scientists have raised questions about the computer models that are being used.

There are three other salient facts that affect Farm Bureau's thinking on this matter.

1. The legislation that passed the House of Representatives will have virtually no impact on the earth's temperature in the year 2050. One report says the bill will have an impact of less than $2/10^{th}$ of a degree by 2050. Administrator Lisa Jackson of the EPA indicated as much in testimony before the Senate Committee on Environment and Public Works. For this reason alone, we believe Congress needs to re-assess the entire premise of the legislation and weigh it against the potentially enormous impact.

2. The legislation that passed the House will have enormous economic consequences for our country and the agricultural sector.

3. Unless other countries, such as China and India, adopt similar emissions restrictions, the United States, if it adopts this legislation, will be imposing tremendous costs on our economy and our children and grandchildren and all for very little if any benefit.

At the outset, we must acknowledge that unilateral cap-and-trade legislation will have little or no impact on the climate. That is because greenhouse gas (GHG) emissions are global; to the degree they are an issue that demands attention, they require a global response. A ton of GHG emitted in China is the same as a ton of GHG emitted in Virginia. Regulating emissions in Virginia without regulating emissions in China will have little or no effect on the environment.

Most experts agree that if the House legislation worked exactly as planned, it would not lower temperatures by more than a few tenths of a degree by 2050[1]. Most experts agree that the United States cannot solve this problem alone. EPA Administrator Jackson, in testimony before the Environment and Public Works Committee and in response to a question on a chart showing the climate impacts, replied, "I believe that essential parts of the chart are that the U.S. action alone will not impact CO_2 levels."

We all support leadership by the United States. But don't forget one thing: leadership only occurs when people are following you. If they're not, then it's the economic equivalent of unilateral disarmament. Leadership does not require the creation of inflexible restrictions on our economy with the hope – which so far seems largely unfounded – that major emitters in the rest of the world will follow. The House bill would actually restrict our negotiating flexibility and leverage with the rest of the world. It is absolutely imperative that other countries, such as China and India, bear their fair share of the burden.

Agriculture producers rely on foreign markets as sources for their products. Similarly, the international marketplace relies to a large extent on us to produce the food and fiber necessary to feed and clothe the world. The United States exported more than $100 billion of agricultural products in 2007 and only the global recession pulled us off that number in 2008.

The increased fuel, fertilizer and energy costs that will result from H.R. 2454 will greatly impact the relationship of American producers with the rest of the world. U.S. agriculture is an energy-intensive industry that relies to a large extent on international markets.

These increased input costs will put our farmers and ranchers at a competitive disadvantage with producers in other countries that do not have similar GHG restrictions. Any loss of international markets or resulting loss of production in the United States will encourage production overseas in countries where production methods may be less efficient than in the United States.

The production of food and fiber in the United States is important both to the U.S. and to the world and we must ensure that our producers are not put at a competitive disadvantage.

The provision adopted by the House, which effectively imposes a border tariff on nations that have not adopted limits on carbon emissions, does not solve the problem – it compounds it. There is a growing amount of discussion on the issue among trade experts, but it will almost certainly be challenged in the World Trade Organization (WTO). India in fact has already said that if it becomes law, it will file a WTO challenge. It would be exceedingly difficult to enforce, and it does not enjoy the support of the administration. Other trade measures in the bill (allowances for manufacturers impacted by international competition, cash rebates, etc.) are also at best murky when viewed against the whole set of trade rules. Any trade measures that will not comply with the WTO do not help us.

---

[1] See Chip Knappenberger, "Climate Impacts of Waxman-Markey (the IPCC-Based Arithmetic of No Gain)," MasterResource, May 6, 2009, at http://masterresource.org/?p=2355 (June 30, 2009).

Absent a carefully constructed global agreement that includes developed and developing economies alike, no amount of punitive domestic regulation will either affect global climate or prevent severe repercussions for the U.S. economy.

A true solution must include every nation. As an example, Least Developed Countries (LDCs) emit 20 percent of global carbon dioxide yet under Waxman/Markey, they are excluded from having to take action. Though they are struggling economies, simply excluding them ignores their emissions and does nothing to assist them in resolving emissions concerns. Instead, it provides incentives not to change and gives them free reign to export carbon-heavy products to the United States at a significant competitive advantage. If this is truly a global problem then we must have buy-in from all nations if we are to find a solution. However, global buy-in will not be achieved if we impose our standards on other nations. This is neither good domestic policy nor good foreign policy.

We cannot and should not unilaterally attempt to regulate global carbon dioxide emissions. This can only be accomplished through a comprehensive global agreement with contributions by all nations or the results on our economy will be devastating. Unilateral action is the wrong course.

Several times in the course of mark-up in the Energy & Commerce Committee, members considered proposals that would have provided an "off-ramp" for the cap-and-trade program. In other words, the program would sunset unless similar commitments were made by other countries. In the absence of an international agreement covering all nations, such an approach would make far more sense than a border tariff that will exacerbate international tensions and not accomplish what it is designed to do.

For Farm Bureau, there are two overriding question to this debate, and they are ones we urge all members of the Senate to confront in no uncertain terms.

1. What do you wish to accomplish?
2. Does it make economic sense for farmers and ranchers?

If you believe that anthropogenic carbon emissions are causing global warming, then recognize the simple fact that the only solution is an international agreement. Doing it unilaterally through legislation is a recipe for disaster for the American economy and for farmers and ranchers. We encourage all members to take a hard look at the evidence and the science before making up your mind on this issue. The ramifications are far too important for you to ignore the legitimate scientific evaluations that question alarmist scenarios.

If, on the other hand, the goal is to wean our economy off the use of fossil fuels, you have an obligation to come up with an energy plan for America. Because agriculture is such an energy intensive endeavor, this is of critical importance for farmers and ranchers. That means that whatever bill is adopted must recognize what will happen when our nation starts starving itself of carbon-based energy forms. If the economy is starved for energy, then prices for energy are bound to increase. Don't let that happen. If you want coal and oil to play less and less a role in our energy mix, then figure out what will take their place – before you put our nation on a diet

that is bound to result in lower economic activity and a depressed Gross Domestic Product (GDP).

In other words, if Congress is going to discourage certain forms of energy by imposing greater costs on them, then provide our economy an alternative. For farmers and ranchers, any alternative that is provided must be affordable and reliable. The Global Warming community is very articulate on what they are against. Unfortunately, they're not quite as vocal about what they support. No one is against wind energy, solar energy, or other renewable sources of supply. But they will not replace significant portions of our base load capacity. Even so, the legislation should incorporate an "off-ramp" similar to the one I mentioned earlier for international efforts. If we find that the level of available renewable power is not being produced, then the emission caps should be relaxed accordingly.

It's not enough simply to be against something – we must be for something as well. A cap-and-trade program will effectively create a hole in our energy supply, leaving farmers, ranchers and others with either reduced sources of much needed energy or energy that is so expensive that many will not be able to afford it. It's Congress's job to "fill that gap," not simply create it. Any legislation considered must be realistic and straightforward.

In that regard, we were pleased that the Senate Energy and Natural Resources Committee included some modest language (Sections 312 and 313) in the legislation it recently approved related to nuclear power. We expect that the Majority Leader will seek to combine the Energy Committee bill with legislation moving forward, but we believe that a true commitment to nuclear power goes beyond a Sense of the Senate resolution. Congress should make an unequivocal commitment to fostering and promoting an aggressive nuclear program and ensure that cap-and-trade emissions limits are not imposed in the absence of a robust program.

The second critical issue is that any legislation must make economic sense for farmers and ranchers, who produce food and fiber for our country and the world.

On the issue of offsets for agriculture, we strongly support the efforts undertaken by Chairman Collin Peterson (D-Minn.) in the House. We firmly believe that there must be an agricultural offsets program and it should be administered by the U.S. Department of Agriculture (USDA). We are also heartened by statements of Chairman Harkin that he will use the Peterson provisions and build upon them in the Senate. We support such an effort.

In this connection, we strongly urge your committee to take an aggressive, active approach in this debate. In our view, it would be a fundamental mistake to rush to judgment on such sweeping legislation, based on a timetable that is decided upon because a particular meeting has been scheduled in Copenhagen later this year. We would urge the Committee to analyze the issue closely, carefully and thoroughly. We would also recommend that you mark up the legislation so that it is as strong and effective as possible for agriculture. On a matter that could affect our nation for literally decades to come, it would be the height of folly to rush to judgment in a matter of days or weeks.

According to the latest EPA *"Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2005"* updated in 2008, agriculture and forestry emit between 6 percent and 7 percent of the total GHG emitted in the United States. The same EPA document also indicates that agriculture and forestry have the potential to sequester between 15 percent and 20 percent of total U.S. emissions. The USDA says that currently these two sectors sequester about 11 percent of total emissions, so these sectors are responsible for reducing more GHG emissions than they emit. It stands to reason that any climate change policy should seek to maximize these contributions from agriculture.

Any climate change legislation will also impose additional costs on all sectors of the economy and will result in higher fuel, fertilizer and energy costs to farmers and ranchers. Cost increases incurred by utilities and other providers resulting from climate change/energy legislation will ultimately be borne by consumers, including farmers and ranchers. Electricity costs are expected to be one-third higher than would otherwise be the case by 2040. EPA's own estimates suggest coal costs could rise by more than 100 percent by 2020. Agricultural producers, unlike other manufacturers in the economy, have a limited ability to pass along increased costs of production to consumers. It is extremely important that those costs be minimized to the greatest extent possible. Farmers are heavily dependent on the price and availability of inputs such as fertilizer and crop protection products. A viable agriculture sector includes viable fertilizer and chemical industries. The fertilizer industry has already gone through major restructuring due to higher natural gas prices and the closure of many U.S. production facilities. More than half of the nitrogen fertilizer used in the United States is imported. Another rise in natural gas prices as EPA projects would likely result from this legislation and thus threaten the remaining fertilizer manufacturing facilities in the United States. This would make us even more dependent on foreign fertilizer imports.

Offsets are an important part of any cap-and-trade program. Because they are only useful to the extent they are cheaper than installing new technology, they serve as a cost-containment mechanism for entities trying to meet cap obligations. That means that fewer costs will be passed on to consumers, thus lowering the cost of compliance of a cap-and-trade program.

Agriculture and forestry are particularly well-suited to provide offsets to capped entities. Agriculture and forestry are not capped sectors under the House-passed bill, and would therefore be eligible to provide such offsets. There are a number of identified agricultural and livestock practices that have been proven to reduce or sequester GHG. These range from shifts out of conventional to conservation tillage, forest management, nutrition management, even afforestation. In order to achieve the full potential for GHG reductions and sequestration, climate policy should allow farmers and ranchers to adopt these practices to provide offset credits to capped entities. Adoption of these practices also provides other environmental benefits besides carbon reduction or sequestration. These other benefits may include reduced soil erosion, improved wildlife habitat, or increased water quality, to name a few.

The provisions establishing an agricultural and forestry offsets program within USDA added by Chairman Peterson go a long way toward meeting those challenges. This program recognizes a wide array of carbon reduction and sequestration practices in which agriculture and forestry can contribute to a cap-and-trade policy. It also allows "early actors" to a limited extent to

participate in the offsets program, thus somewhat eliminating the perverse incentive of penalizing proactive farmers and rewarding latecomers. USDA understands the needs of producers and can work effectively with them to develop projects that meet the needs of the cap-and-trade market as well as the needs of producers. USDA also has the resources and the network to work effectively with farmers and ranchers to administer an agricultural offsets program.

Any cap-and-trade legislation must contain an agricultural and forestry offset program such as the one included in the House passed bill. Additionally, we believe domestic offsets should take priority over international offsets.

But inclusion of an offset program is not the complete answer. Even with a robust agricultural offsets title as indicated above, however, the bill still does not make economic sense for farmers and ranchers. There are several reasons for this.

First, a number of agricultural sectors will not be able to benefit from an offsets program. The attractiveness of offsets as a possible revenue stream for producers and a cost-containment measure for consumers should not cloud the fact that there are a number of agricultural producers who will not be able to benefit from offsets. That is because their production methods and practices are such that they have little or no opportunities to sequester or reduce GHG. There are clearly winners and losers in agriculture in the offsets markets. As a general farm organization, AFBF represents all commodities, and we must consider all of their interests and concerns. Let me cite just a few examples:

- Dairy – Some people suggest that dairy operators will benefit by installing methane digesters. These digesters are expensive and can easily run into regulatory hurdles.
- Fruit & Vegetables – Many specialty crop producers simply do not have the opportunities to qualify for offsets.
- Wheat & Corn – Many growers in these commodities are looking for monetizing benefits from no-till agriculture. Yet, EPA has explicitly said that no-till does not provide sequestration opportunities.

There are other examples. Cotton producers, for instance, would have at best limited opportunities to benefit from offsets. Western ranchers whose operations are heavily dependent on the use of federal lands for livestock forage also have very limited offset opportunities. These ranchers are constrained in the types of grazing practices they can employ on federal lands, and federal lands themselves do not qualify for offset opportunities. Potato producers also have little or no opportunity to provide offsets. In fact, many areas in the West in general that are the most coal-dependent are also the areas that have limited offset opportunities. Thus, they will face higher costs with little or no opportunity to offset those costs.

EPA suggests that there are no revenues to return to the sector from reduced tillage or no-till practices. It appears to be their view that land management practices have already adjusted sufficiently to the point that there is little additional carbon sequestration left to be gained by shifts to no-till or other conservation tillage practices in the future. If the EPA's view is allowed to prevail, offset opportunities for an even more significant segment of our sector will be

foreclosed, and carbon sequestration opportunities will be lost. Not all areas of the country are able to productively adopt conservation tillage practices, however, thus further restricting their offset possibilities.

Yet, these producers will incur the same increased fuel, fertilizer and energy costs as their counterparts who can benefit from an offsets market.

In addition, revenue from offsets will defray only a portion of the increased input costs resulting from a cap-and-trade program, and not all of the costs. Producers will still face the prospect of increased input costs without the ability to pass on those costs. H.R. 2454 was amended to defer auction of emission allowances for a significant portion of the total allocation, a factor that really delays but ultimately does not remove overall program costs. More free emission allowances also means a lower price of carbon and a lower demand for offsets. As the price of carbon and offsets rise, producer input costs will rise as well. We have not, as of yet, been able to identify any scenario where the costs of cap-and-trade will not exceed revenues from offsets. And that is even before we factor in any transactional costs associated with development, monitoring or verification of offsets that might be incurred by producers.

From a broader perspective, Farm Bureau's goal has been to contribute positively to the debate over climate change. We certainly hope this committee will do the same.

I would like to provide a general discussion of how we view the economics of cap-and-trade. I must caution the committee, however, that it is very difficult to give a precise and accurate economic assessment of H.R. 2454. That is so for several reasons:

1. Nearly all the economic figures surrounding this bill are based on EPA's analysis provided either in April or June;
2. These economic projections are keyed to a specific set of assumptions ranging from unfettered access to nuclear power to unveiling of carbon capture and sequestration technology; and
3. Given that EPA favors the legislation and was directed by Chairman Henry Waxman's (D-Calif.) staff to use certain assumptions, we believe it is safe to say any cost estimates I provide you today are not only minimal but are probably unrealistically optimistic.

Let me give the committee a flavor for the kind of assumptions that underpin the legislation:

1. EPA in its analysis used assumptions "provided by committee staff on the use of allowances"[2] that:
    - Increased carbon capture and sequestration bonus allowances;
    - Provided that necessary allowances would be deficit neutral; and
    - All remaining allowances would be returned to households in a lump sum fashion.
2. EPA in its analysis used committee staff directions on the commercialization of Carbon Capture Storage (CCS) technology. EPA assumed this technology would be affordable

[2] *EPA Preliminary Analysis of Waxman-Markey Discussion Draft*, 4/20/09 available at http://www.epa.gov/climatechange/economics/economicanalyses.html#wax, page 10

and commercially available starting in 2014, whereas most other estimates are for 2020 or 2025 or beyond. None are in place today.

3. EPA in its analysis used previous assumptions by MIT[3] on the degree to which developing nations, such as China, would engage in similar emissions-reduction policies. For China and India, for example, this assumes that these countries (and others in the developing world) "would adopt a policy beginning in 2025 that returns and holds them at year 2015 emissions levels through 2034, and then returns and maintains them at 2000 emissions levels from 2035 to 2050."
4. Yet, EPA notes[4] that "While this analysis contains a set of scenarios that cover some of the important uncertainties when modeling the economic impacts of a comprehensive climate policy, there are still remaining uncertainties that could significantly affect the results."
5. A large share of emissions reductions stem not from the policies in the bill but from reduced GDP as a result of the economic recession, as well as earlier policy changes enacted in the *Energy Independence and Security Act*. The source for these emissions reductions is the latest (2009) Annual Energy Outlook.

Earlier analysis by EPA of the Lieberman/Warner proposal looked at the effects on carbon prices and other economic variables if the fundamental assumptions regarding nuclear power and other portfolio mix shifts did not occur. Without that addition of nuclear power generation, carbon prices and associated energy costs almost doubled compared to the earlier base case. It is critical that we understand how sensitive EPA's analysis of this bill is to these underlying assumptions. Certainly one should know those answers before taking the bill to the floor. In fact, we strongly recommend the committee require EPA to provide analysis using assumptions similar to those contained in Scenario 7 of its Lieberman/Warner proposal study. Because while the caps will be written into law, the market and power generation structures implied by EPA's current analysis are just a set of assumptions.

Let me cite just two examples.

In the MIT study mentioned earlier, the authors point out that they "limited nuclear electricity generation to that possible with current capacity on the basis that safety and siting concerns would prevent additional construction. With strong greenhouse gas policy such concerns may be overcome, especially if other major technologies such as carbon capture and storage can not be successfully developed, run into their own set of regulatory concerns, or turn out to be very expensive."[5] In other words, a carbon-less world might be so expensive that nuclear energy becomes a viable source of electricity generation. The authors go on to say that the "fate of CCS is the mirror image. With nuclear limited, CCS expands beginning in 2020 to about 18 EJ in 2050. When nuclear is allowed to compete on economic terms, some CCS is viable but losing out to nuclear after 2040, when the CO_2-e price has risen substantially. Coal generation without CCS disappears in either case. These relatively detailed results help illustrate the scale of effort required to meet these policy constraints. There are just over 100 nuclear reactors in the U.S. today, and so a six-fold increase in nuclear generation would require the construction of

---

[3] *Assessment of U.S. Cap-and-Trade Proposals*, Report No. 146, April 2007
[4] Op. cit., page 4
[5] MIT study, op. cit., page 32

approximately 500 additional reactors. If nuclear cannot penetrate the market the scale issue is not avoided but instead is transferred to CCS, requiring siting and construction of about the same number of new CCS plants."

Those are enormous variables.

The second example was articulated in a story discussing the Waxman-Markey bill's allocation of about $200 billion for CCS technology. Pointing out the almost unprecedented level of money (six times greater than the amount contemplated in legislation considered in the Senate a year ago, according to the author), an article[6] in the trade press nevertheless quoted an energy researcher as saying CCS may never even materialize.

"At the most optimistic, this bill is the beginning of a revolution. Or it could just be a flash in the pan," said Kevin Book, managing director at energy research firm ClearView Energy Partners." Another expert, Sarah Forbes at World Resources Institute, was quoted as saying she was not sure the funding was enough. Still others pointed out technological and legal issues that have not been answered.

These are just two examples of the kinds of assumptions that underlie the House bill. It is nearly impossible to evaluate exactly how such scenarios will play out, nor does it seem reasonable, given the magnitude of the unknown, that everything will come out just right.

And again, we need to remind all members of the committee – this legislation will have virtually no impact on global climate.

Let me point out one way that we believe it creates tremendous potential for problems in the future.

In order to facilitate passage of the legislation, sponsors of the bill generally decided not to auction off the allowances, as President Obama said he wished to do. Auctioning, according to the administration, would have raised more than $600 billion. But in order to hold down the costs of the legislation to consumers, and thus get more votes for the bill in committee, the legislation's sponsors gave away more than 80 percent of the allowances for free.

It is not hard to imagine a scenario, in a year or two when the federal deficit remains quite large, for this administration or some members of Congress, when looking for revenues, to go back to the cap-and-trade program and utilize it as a source of revenue for the Federal Treasury by auctioning off the permits. Previous administrations have sought to auction off the radio spectrum as a way of raising money. Given the demands on the Treasury, we have little doubt that once put in place; a cap-and-trade scheme will provide an easy mechanism for some to look to as a way of hitting peoples' pocketbooks. It will be an energy version of the tobacco "sin" tax, revisited or the sweetener tax now being discussed, when the need arises to raise money.

---

[6] "Carbon Capture and Storage Moves to Center Stage of cap-and-trade Debate", *Climate Wire*, June 9, 2009

Even laying aside that scenario, however, there is no question that the national effort to cap and then further reduce GHG emissions represents a significant restructuring of the nation's economy. While most policy options on the subject to date have not included production agriculture as a capped sector, agriculture would certainly feel the effects of limiting GHG output through the changes in the energy production industry. At the very least there will be increases in energy costs in general, but more specifically higher costs faced by sectors that provide inputs to production agriculture. As these costs are passed to agriculture, producers certainly will react but are constrained as to the extent to which they may respond. Additionally, higher energy costs faced by those sectors which purchase agricultural products will result in lower prices offered to producers.

Taking EPA's estimates of 2020 costs of the preliminary draft of the Waxman-Markey bill, AFBF projects input costs would rise by $5 billion versus a continuation of current CO_2 policy. This $5 billion essentially carries forward to a nearly full $5 billion reduction in farm income. Corn production, with a heavier emphasis on energy-based crop nutrient requirements, would face some of the highest increases in costs with a rise of 9 percent. Conversely, soybean producers, due to a much smaller reliance on energy-based inputs, will only see costs move by 5 percent. Not surprisingly, this shift in costs is expected to lead to a shift out of corn and into soybean production. Overall, producers are expected to reduce slightly – by half a million acres or so – overall plantings in response to these higher costs.

Recently, the Food and Agricultural Policy Research Institute at the University of Missouri and the Center for Agriculture and Rural Development at Iowa State University each conducted an analysis of the effects of the bill. In both cases the groups showed a lower effect from the legislation than that developed by Farm Bureau.

With respect to the Missouri analysis, the differences can be primarily explained by two factors. First, the Missouri effort used the June EPA estimates as to the effects of the bill as opposed to the April figures we have used. Probably more importantly however are different methodologies used to anticipate changes in phosphate and potassium fertilizers.

For the Iowa State analysis, the researchers only examined the carbon content of inputs for corn and soybean production and did not incorporate the fact that for natural gas in particular – a major input into nitrogen fertilizer production – the changes in market prices will likely exceed just the increase suggested by carbon allowance prices as suggested by EPA.

But it is critical not to stop in 2020, even though much of the analysis conducted to date tends to focus on these early-year effects. As mentioned earlier, the full impact of the bill will not be realized until 2050. Conducting analysis of an industry as dynamic as agriculture for effects more than 40 years in the future is difficult at best and certainly subject to a great deal of debate. But the fact remains that this legislation is intended to set in law specific targets the economy must meet by the time we get to 2050. It will set rules on how our children and our grandchildren must be prepared to farm to be in compliance with this bill.

EPA's estimates of how things will look in 2050 under this legislation suggest a substantially different world. For example, the 2020 CO_2 prices estimated by EPA come in at $22.20 per ton

– expressed in 2005 dollars. For 2050, CO_2 prices – again in 2005 dollars – by EPA's estimates are $95.90 per ton. Consequently, the relatively minor adjustments discussed before for 2020 policy implementation pale in comparison to how the sector will be impacted by 2050.

Extending the same analytical approach used before, we have imposed those higher energy costs on the industry as if they occurred in 2012. Then we looked at the industry behavior under those new conditions.

Production costs under that scenario rise by $13 to $14 billion after the initial year's impacts. Here again, acreage shifts occur between commodities, with corn and other energy-intensive input crops giving land to less-intensive crops, primarily soybeans. Overall, producers shift out of roughly 1.5 million acres. Input costs averaged over the third to fifth year subsequent to the shock rise by $13 billion, with nearly $11 billion of that rise deriving from higher fertilizer costs. Overall, farm income is estimated to run $13 billion lower than would be the case without CO_2 costs in the $90+ per ton range. Further, consumer spending on food rises by just over $13 billion.

Moreover, these are not the only shifts in acreage. Another area of concern is the potential for land to shift from farm to forest production and the consequences of such shifts. Some of this acreage will no doubt come from land currently devoted to pasture and forage production and would therefore place even greater limits on the cattle industry. It is also possible we may get some shifts out of crop production into trees if CO_2 prices were to rise sufficiently. Much more work is needed to understand the full effects of these potential land use adjustments.

There is also a potential revenue stream available by sales of crop residue as an input into the renewable electricity standard. Studies on this issue suggest the greatest contributor to this energy source will be corn stover, with wood chips and other forest management residue also providing a major source.

Removing stover from the field will, however, also remove some crop nutrients from the same field. Consequently, taking that residue off the field will require producers to increase their fertilization rates to keep up the same level of productivity. As has been pointed out more than once, fertilizer – especially energy-intensive fertilizers – are not cheap and are expected to rise even more due to this legislation.

Some studies suggest corn stover at current fertilizer and fuel costs will need to receive at least $60 per ton in order to justify bringing the product to the field edge.

In conclusion, we remain very concerned about the broad potential adverse impacts of cap-and-trade on agriculture. Even though some say agriculture will benefit, that will depend to a great degree on where the producer is located, what he or she grows, and how his or her business model can take advantage of any provisions in the legislation. Not every dairy farmer can afford to capture methane – it is a capital-intensive endeavor. Not every farmer lives in a region where wind turbines are an option. Not every farmer can take advantage of no-till. Not every farmer has the land to set aside to plant trees.

Yet, every farmer has production costs to meet. Nearly all of us rely on fertilizer. We all drive tractors. We all use energy in our production. We know our costs will rise. And frankly, we are very concerned about the impact of this legislation on our livelihood.

I appreciate this opportunity to offer these comments to the committee and will be pleased to respond to any questions.

STATEMENT OF THOMAS VILSACK
SECRETARY OF AGRICULTURE
BEFORE THE SENATE AGRICULTURE COMMITTEE

JULY 22, 2009

Mr. Chairman, Ranking Member Chambliss, and members of the Committee, I appreciate the opportunity to discuss with you today the role of agriculture and forestry in global warming legislation. I am pleased to be here today with Administrator Jackson and Dr. Holdren.

Climate change is one of the great challenges facing the United States and the world. The President believes it is important that America show international leadership on climate change. I want to commend the House of Representatives for taking a critical step towards the passage of comprehensive energy and climate legislation. The Administration looks forward to working with the Senate to craft legislation that creates jobs, reduces our dependence on oil, increases national security, and reduces the risks associated with climate change while also promoting economic growth.

Climate change has enormous implications for farmers, ranchers and forest landowners. Drought, more intense weather events, forest fires, and insect and disease outbreaks are just some of the potential effects of a warming climate that could subject landowners and rural communities to enormous potential costs. For example, the U.S. Climate Change Science Program and Subcommittee on Global Climate Change Research reported that forest landowners are already seeing the impacts of climate change on the health and productivity of our forests.

At the same time, farmers, ranchers and forest landowners have a very important role to play in addressing global warming. In fact, by effectively exploiting opportunities within the agriculture and forestry sectors, we can significantly reduce the cost of meeting our climate policy goals.

I believe there are significant opportunities for landowners in a cap and trade program that can help revitalize rural America through the creation of jobs and wealth. The production of low carbon energy from biomass, anaerobic digesters and wind will provide landowners with new sources of revenue that have significant value in a low-carbon economy. There are also options for landowners to reduce their energy expenditures. USDA is already working with landowners to reduce energy costs and improve profitability.

A robust carbon offsets market will also provide farmers, ranchers and forest landowners with the potential for new sources of income. Rural communities could in turn benefit from jobs created to implement conservation practices and measure and monitor carbon offset activities. To be effective in addressing climate change, the offsets market will need to accomplish two goals. First, the offsets market must be large, with thousands of

participating landowners. To get to scale, the market will require an infrastructure of people and agencies that can encourage landowner participation, provide information to landowners, manage data and resources, and maintain records and registries. Second, ensuring that agricultural and forest offsets provide real and verifiable greenhouse gas reductions is critical to not only addressing climate change but to maintaining public confidence in the carbon offset program as well.

Implementing an offsets market will require a partnership of several Federal agencies, including USDA, EPA, the Department of Interior and others. USDA has many assets that we can bring to bear, including a network of field staff across the country, and greenhouse gas management experience with croplands, rangelands, forests and livestock.

Even with these opportunities, many in the agricultural and forestry community are concerned about the potential costs of climate change legislation. At USDA, we hear these concerns loud and clear. And, I know all of you are hearing from the farmers, ranchers and forest landowners in your states about the potential costs of climate change legislation.

Although we realize there are a variety of specific approaches that can be used to achieve clean energy and climate goals, over the last several weeks, USDA has analyzed costs and benefits of the House-passed climate legislation for agriculture. Our analysis demonstrates that the economic opportunities for farmers and ranchers can potentially outpace – perhaps significantly – the costs from climate legislation.

Of course, any analysis of the implications of climate change legislation, including our analysis of HR 2454, shows that the farm sector will experience both costs and benefits. Agriculture is an energy intensive sector with row crop production particularly affected by energy price increases. For example, fertilizer and fuel costs account for 50 to 60 percent of variable costs of production for corn.

USDA's preliminary analysis of costs and benefits on the agricultural sector uses energy price and other information contained in EPA's recent analysis of HR 2454. Let's first look at the cost side. Increases in fuel prices are expected to raise overall annual average farm expenses by about $700 million between 2012 and 2018, or about 0.3%. Annual net farm income as a result of these higher energy prices is expected to fall by about 1 percent. These estimates assume that in the short term farmers are unable to make changes in input mix in response to higher fuel prices—so they likely overestimate the costs to farmers. Fertilizer prices will likely show little effect until 2025 because of the HR 2454's provision to help energy-intensive, trade exposed industries mitigate the burden that the emissions caps would impose.

The agriculture sector also will benefit directly from allowance revenues allocated to finance incentives for renewable energy and agricultural emissions reductions during the first five years of the HR 2454 cap and trade program. Funds for agricultural emissions

reductions are estimated to range from about $75 million to $100 million annually from 2012-2016.

To evaluate the potential impact on the agricultural sector further out in time, we first examine a simple case that allows producers to change the crops they grow but not how they produce them. This approach is conservative given the observation that energy per unit of output has drastically declined over the last several decades. Nevertheless, the estimated impact of the cap and trade provision of HR2454 implies a decline of annual net farm income of $2.4 billion, or 3.5%, in 2030 and $4.9 billion, or 7.2%, in 2048. These estimates are likely an upper bound on the costs, because they fail to account for farmer's proven ability to innovate in response to changes in market conditions.

Our analysis is also conservative because it doesn't account for revenues to farmers from biomass production for bioenergy. A number of studies have examined the effects of higher energy costs with models that allow for expected changes in production management practices and switching to bioenergy crops.[1] Based on the analysis of Schneider and McCarl, for example, allowing for changes in input mix and revenues from biomass production - but without accounting for income from offsets -, it is estimated that annual net farm income would increase in 2030 by about $0.6 billion or less than 1 percent. By 2045, annual net farm income is estimated to increase by more than $2 billion or 2.9%.

HR 2454's creation of an offset market will create opportunities for the agricultural sector. In particular, our analysis indicates that annual net returns to farmers range from about $1 billion per year in 2015-20 to almost $15-20 billion in 2040-50, not accounting for the costs of implementing offset practices. EPA has conducted its own analysis of returns from offsets that take into account the costs of implementing land management practices. EPA's analysis projects annual net returns to farmers of about $1-2 billion per year from 2012-18, rising to $20 billion per year in 2050. It's important to note that EPA's analysis includes revenue generated from forest management offsets while USDA's does not.

So, let me be clear about the implications of this analysis. In the short term, the economic benefits to agriculture from cap and trade legislation will likely outweigh the costs. In the long term, the economic benefits from offsets markets easily trump increased input costs from cap and trade legislation. Let me also note that we believe these figures are conservative because we aren't able to model the types of technological change that are very likely to help farmers produce more crops and livestock with fewer inputs. Second, the analysis doesn't take into account the higher commodity prices that farmers will very likely receive as a result of enhanced renewable energy markets and retirement of environmentally sensitive lands domestically and abroad. Of course, any economic analysis such as ours has limitations. But, again, we believe our analysis is conservative – it's quite possible farmers will actually do better.

---

[1] For example, see Schneider, Uwe A. and Bruce A. McCarl. "Implications of a Carbon-Based Energy Tax for U.S. Agriculture." Agricultural and Resource Economics Review 34/2 (October 2005): 265-279.;

What does this mean for the individual farmer? A Northern Plains wheat producer, for example, might see an increase of $.80 per acre in costs of production by 2020 due to higher fuel prices. Based on a soil carbon sequestration rate of 0.4 tons per acre and a carbon price of $16 per ton, a producer could mitigate those expenses by adopting no-till practices and earning $6.40 per acre. So, this wheat farmer does better under the House passed climate legislation than without it. And, it's quite possible that this wheat farmer could do even better if technologies and markets progress in such a way that allows for the sale of wheat straw to make cellulosic ethanol.

We recognize that climate legislation will affect different landowners in different ways. This is an important point. USDA can help smooth this transition by using our Farm Bill conservation programs to assist landowners in adopting new technologies and stewardship practices. It is also worth noting that the House bill includes important provisions regarding how to adapt and increase resiliency to climate change impacts, which will be important for our nation's farmers, ranchers and forest landowners. Ensuring that landowners and communities have the tools and information they need to adapt to climate change is a priority for this Administration.

In conclusion, I want to thank this Committee for its interest and involvement in this issue. The leadership you provide will help farmers, ranchers and forest landowners participate in and benefit from climate legislation. The participation of rural landowners is, I believe, vitally important to the success of any cap and trade program. USDA looks forward to working with you as we move forward.

DOCUMENTS SUBMITTED FOR THE RECORD

JULY 22, 2009

A PRELIMINARY ANALYSIS OF THE EFFECTS OF HR 2454 ON U.S. AGRICULTURE

Office of the Chief Economist
U.S. Department of Agriculture
July 22, 2009

Executive Summary

USDA performed a preliminary economic analysis of the impacts of House-passed climate legislation, HR 2454, on U.S. agriculture. The analysis assumes no technological change, no alteration of inputs in agriculture, and no increase in demand for bio-energy as a result of higher energy prices. Therefore, it overestimates the impact of the climate legislation on agriculture costs in the short (2012-18), medium (2027-2033), and long-term (2042 to 2048). In USDA's analysis, short-term costs remain low in part because of provisions in HR 2454 that reduce the impacts of the bill on fertilizer costs. In fact, the impact on net farm income is less than a 1% decrease. In the short run, agricultural offset markets may cover these costs. Over the medium-term and long-term, costs to agriculture rise but remain modest (3.5% and 7.2% decreases in net farm income, respectively). However, benefits to agriculture from an offsets market rise over time and will likely overtake costs in the medium and long term. Other studies that account for the impact of higher energy prices on input substitution and demand for bio-energy find that HR2454 leads to higher agricultural incomes, even without offsets. In summary, USDA's analysis shows that the agricultural sector will have modest costs in the short-term and net benefits – perhaps significant net benefits – over the long-term.

Overview

This analysis examines the potential effects on US agriculture of the cap-and-trade program that would be implemented under HR 2454, the American Clean Energy and Security Act of 2009, as reported by the House Committee on Energy and Commerce on May 21. The analysis is based on the energy price effects estimated by EPA and published in their June 23 analysis of HR 2454. The effects of higher energy costs on agricultural supply, demand, prices and net farm income are compared to the baseline values over 2012-18. We then examine the impacts of energy price increases over the medium (2027-33) and long term (2042-48).

HR 2454 would also provide opportunities for farmers and ranchers to receive payments for carbon offsets. While we include the gross revenues associated with offsets, this report does not consider the potential effects of the offsets markets on commodity prices. The removal of cropland and pastureland for afforestation would place upward pressure on crop prices, benefitting producers of livestock feed but leading to higher livestock input costs and higher producer prices for livestock and milk. We have not yet integrated these factors into our estimates of changes in net farm income. In addition, our analysis does not assess the change in farm income due to the Renewable Electricity Standard and other provisions in HR 2454 that increase the demand for biomass and could provide additional sources of income for the agricultural sector.

Agriculture and Energy Use

Agriculture is an energy intensive sector with row crop production particularly affected by energy price increases.[1] Direct energy consumption in the agricultural sector includes use of gasoline, diesel fuel, liquid petroleum, natural gas and electricity. Indirect energy use involves agricultural inputs such as nitrogen and other fertilizers which have a significant energy component associated with their production.

For 2009, USDA forecasts that direct fuel and electricity expenses for U.S. farms will be $15.3 billion and will account for 7.7 percent of total operating costs.[2] Expenses from indirect energy use increase total energy expenditures to $39.3 billion, about 19.7 percent of operating costs. Fertilizers embody the most energy among production inputs because natural gas is the primary input (70-90 percent of cost of producing nitrogen fertilizer).

The potential impacts of higher energy costs on production costs are greatest for feed grains and wheat producers where energy costs account for over 50 percent of total operating costs (figure 1).[3] Per-acre energy expenses for rice and cotton are generally higher than per acres expenses for corn and wheat, but as a proportion of total operating costs, they are typically lower. Per acre energy input costs are lowest for soybeans production, which account for 31 percent of total operating costs over 2004-08.

Energy costs vary regionally as well, In general, producers in regions more dependent on irrigation tend to spend more on direct fuel expenditures such as natural gas or electricity (figure 2). Direct energy costs make up a small share of total operating costs on livestock operations, comprising less than 10 percent of total operating costs for hogs, dairy and cow-calf operations. However, these operations can experience higher energy costs indirectly through higher feed production costs. Feed costs make up roughly 60 percent of total livestock production costs.

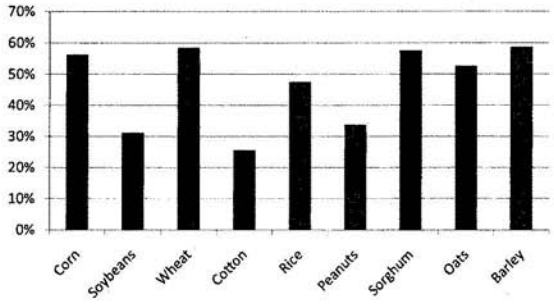
---

[1] Shoemaker, Robbin, David McGranahan and William McBride. "Agriculture and Rural Communities are Resilient to High Energy Costs" *Amber Waves*. Volume 4, No. 2. USDA, Economic Research Service. Apr 2006. Pp 18-21

[2] USDA, Economic Research Service, *Farm Income and Costs Briefing Room*. Feb. 12, 2009. Available at http://www.ers.usda.gov/briefing/farmincome/

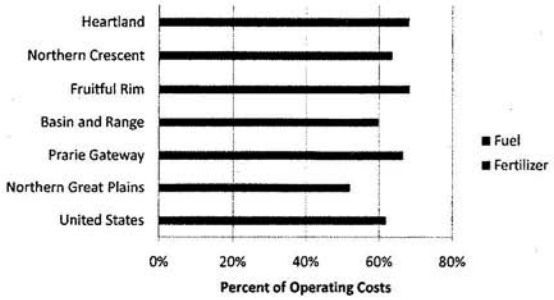
[3] Other operating costs include seed, chemicals, custom work, repairs. See http://www.ers.usda.gov/briefing/farmincome/

Figure 1--Energy costs as a share of total operating costs, 2005-08 average



Source: Economic Research Service

Figure 2--Wheat energy input costs by region, 2007-08



Source: Economic Research Service

Impacts of HR 2454 on Energy Prices

The EPA analysis of HR 2454, published on June 23, 2009, estimates that prices for petroleum, electricity, and natural gas could rise above baseline levels by 4.0 percent, 12.7 percent, and 8.5 percent, respectively, by 2020 (table 1). As the limits on greenhouse gas (GHG) emissions become more constraining over time, the impact on energy prices becomes more significant. By 2035, EPA estimates that prices for petroleum, electricity, and natural gas could rise above baseline levels by 7.2 percent, 14.3 percent, and 16.9 percent, respectively. By 2050, EPA estimates that petroleum prices could be almost 15 percent above baseline prices, while natural gas and electricity prices could exceed baseline levels by over 30 percent.

Table 1—Estimated Impacts of HR 2454 on Energy Prices

	2015	2020	2025	2030	2035	2040	2045	2050
	$ per ton CO_2e (2005 $)							
Allowance price	12.64	16.31	20.78	26.54	33.92	43.37	55.27	70.40
	Percent change from baseline							
Electricity price	10.7	12.7	14.0	13.3	16.9	24.0	29.1	35.2
Natural gas price	7.4	8.5	8.6	10.4	14.3	18.9	24.1	30.9
Petroleum price	3.2	4.0	4.7	5.6	7.2	9.0	11.4	14.6

Source: EPA, June 23, 2009.

While most of the direct energy price increases would be felt immediately by the agricultural sector, fertilizer costs would likely be unaffected until 2025 due to provisions in HR 2454 that would distribute specific quantities of emissions allowances to "energy- intensive, trade exposed entities" (EITE).[4] Nitrogenous fertilizer manufacturing is included on a list that EPA has assembled of presumptively eligible EITE sectors. Additionally, EPA analysis indicates that the allocation formula would provide enough allowances to cover the increased energy costs of all presumptively eligible EITE industries. Based on these considerations, the USDA analysis assumes HR 2454 imposes no uncompensated costs on nitrogen fertilizer manufacturers related to increases in the price of natural gas through 2024. These allocations are terminated beginning in 2025. This reflects an assumption that enough foreign countries have adopted similar GHG controls to largely eliminate the cost advantage for foreign industries. These assumptions are consistent with the treatment of EITE industries, including nitrogen fertilizer manufactures, in the EPA analysis of HR 2454.

Assessing the Impacts of Higher Energy Prices on Agriculture

To estimate the impacts of rising energy prices on agriculture, this study uses the Food and Agricultural Policy Simulator (FAPSIM). FAPSIM is an annual econometric model of the U.S.

[4] Under Subtitle B of Title IV, "energy- intensive, trade exposed entities" (EITE) covers industrial sectors that have: 1) an energy or greenhouse gas intensity of at least 5% and a trade intensity of at least 15%; or 2) an energy or greenhouse gas intensity of at least 20%. Without these allocations, firms in EITE industries would incur energy-related costs that foreign competitors would avoid; hence, putting them at significant market disadvantage. The bill sets a maximum amount of allowances that can be rebated to EITE industries at, 2% for 2012 and 2013, 15% in 2014, and then declining proportionate to the cap through 2025. Beginning in 2026, the amount of allowance rebates will begin to be phased out and are expected to be eliminated by 2035. The phase-out may begin earlier or be delayed based on Presidential determination.

crop and livestock sectors that includes cross-commodity linkages and dynamic effects over time. Commodities included in FAPSIM are corn, sorghum, barley, oats, wheat, rice, upland cotton, soybeans, cattle, hogs, broilers, turkeys, eggs and dairy. Each commodity submodel contains equations to estimate equations to estimate production, prices and the different demand components. The submodels are then linked together through common variables that are important to the different commodities. The model solution computes the markets prices that balance supply and demand in all commodity markets simultaneously.

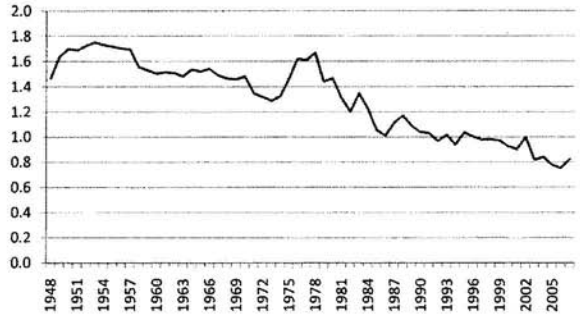
FAPSIM is calibrated to the USDA February 2009 baseline which forecasts supply, demand and price estimates to 2018. We then assess the role of higher energy prices over three time periods. The short-term impacts assess the effects of energy price changes over 2012 to 2018, the medium-term impacts assess the effects of energy price changes over 2027 to 2033, and the longer-term impacts assess the effects of energy price changes over 2042 to 2048.

The estimated effects from the FAPSIM model do not take into account technological changes that may occur because of higher energy prices or potential strategies producers may adapt to reduce the use of energy inputs (beyond switching to crops with lower energy intensities) as the prices for energy intensive inputs increase. In the short run, producers may take actions to reduce energy use. For example, according to the 2006 Agricultural Resource Management Survey (ARMS), 524,000 operators—representing about a quarter of all farmers—took some action to reduce fuel or fertilizer expenses in 2006.[5] To reduce fuel expenses, the most common practices were to regularly service engines and reduce the number of trips over a field. Cutting back on the quantity of fertilizer applied was the most common practice employed to reduce fertilizer expenses. Other actions included conducting soil tests (to determine an efficient mix of fertilizer use) and negotiating price discounts.

Over the long run, technological changes could help mitigate costs. For example, higher energy costs in the 1970s prompted all sectors of the U.S. economy to increase energy efficiency. Energy intensity—defined as energy consumption per unit of total output—has steadily declined over time due to gains in energy efficiency in the agricultural sector (figure 3).

[5] USDA, Economic Research Service. *Agricultural Income and Finance Outlook.* AIS-85. December 2007. pp 30-31.

Figure 3--Energy use per unit of total farm output (1996 = 1)



Source: Economic Research Service

Short-Term Impacts on Agriculture

To assess the short-term impacts we use the EPA energy price impacts to determine the impacts of HR 2454 on the prices paid indices (PPIs) for agricultural inputs over 2012-18. The PPI for fuel increases by 2.6 percent above baseline levels on average over 2012-18. Because of the EITE provisions of HR 2454, fertilizer prices are largely unaffected.[6]

Production Costs

The increases in energy prices cause the variable cost of production (COP) per acre to increase for all crops (table 2). The extent of the price increases above the baseline levels ranges from an average of 0.3 percent for upland cotton to 0.9 percent for sorghum.

Because of the EITE provisions, most of the impacts are felt through increased fuel costs. Thus, those crops where fuel costs are proportionately higher showed larger impacts (e.g., rice, sorghum.) The largest impacts in absolute terms were for rice producers with an average increase over 2012-18 of $3.09 per acre (an increase of 0.7 percent in total operating costs). Soybeans showed the smallest absolute increase ($0.45 per acre).

[6] In the absence of the EITE provisions, higher natural gas prices would likely cause the PPI for fertilizer to increase by 4.0 percent above baseline levels on average over 2012-18.

Table 2—Effects of HR 2454 on Variable Costs of Production, 2012-18 annual average, ($/acre, 2005 $)

Crop	With allotments for fertilizer industry	No allotments for fertilizer industry	Value of allotments to producer
	$/acre, 2005$ (percent)		$/acre, 2005$
Corn	1.19 (0.4%)	6.01 (2.2%)	4.82
Sorghum	1.26 (0.9%)	2.81 (2.0%)	1.56
Barley	0.70 (0.6%)	2.52 (2.0%)	1.82
Oats	0.57 (0.6%)	2.09 (2.2%)	1.52
Wheat	0.66 (0.6%)	2.49 (2.2%)	1.83
Rice	3.09 (0.7%)	7.02 (1.6%)	3.93
Soybeans	0.45 (0.4%)	1.28 (1.1%)	0.83
Upland cotton	1.46 (0.3%)	4.03 (0.9%)	2.58

The table also shows the estimated impact on costs of production in the absence of the EITE provisions. Not surprising, fertilizer costs would increase the costs of production by a far greater amount for all commodities. Using the EPA energy price estimates, we estimate corn production costs could increase by an average of $6.01 per acre in real 2005 dollars in the near term (2012-18), an increase of about 2.2 percent. Less energy-intensive crops such as soybeans experience proportionately smaller impacts.[7] Nonetheless, the EITE provisions would protect producer from higher fertilizer prices that might otherwise be expected with the increase in natural gas prices.

Total farm production expenses could rise by 0.3 percent, in the near term (table 3). Expenses for fuel, oil, and electricity are estimated to increase by about 6.4 percent. Over the near-term, total farm expenses could increase by $0.7 billion per year in real 2005 dollars, on average.[8]

Table 3—Effects of HR 2454 on Total Farm Expenses and Selected Inputs, 2012-18

Item	Billion $ (2005 $)
Total expenses	0.7
Fertilizer and lime	< 0.1
Fuel, oil and electricity	0.7*

*Totals may not add due to rounding.

Prices

[7] These impacts are similar to those found by FAPRI in their recent report, "The Effect of Higher Energy Prices from HR 2454 on Missouri Crop Production Costs." Available online at: http://www.fapri.missouri.edu/outreach/publications/2009/FAPRI_MU_Report_05_09.pdf

[8] In absence of the EITE provisions, higher fertilizer prices could lead to an average annual increase in crop production expenses of $1.4 billion over 2012-18.

Increasing production costs reduce profitability causing a small decline in planted acreage and some switching to less energy-intensive crops. This leads to higher crop prices which partially offset the increase in production costs (table 4). Higher crop prices increase feed costs, however, which leads to a small contraction in livestock and dairy production, and higher prices for those products. Over 2012-18, because of the EITE provisions, the effects of higher energy prices are quite small with almost negligible impacts on crop and livestock prices.

Table 4—Effects of HR 2454 on Commodity Prices, 2012-18

Crop	Percent Change
Crops	
Corn	0.1
Sorghum	0.2
Barley	0.1
Oats	0.1
Wheat	0.1
Rice	0.1
Soybeans	0.0
Upland cotton	0.1
Livestock	
Choice steers	0.0
Hogs	0.0
Broilers	0.0
Turkeys	0.0
Eggs	0.0
Milk	0.0

Total Receipts and Net Farm Income

Net farm income declines marginally in the near term. Based on the EPA energy price impacts, and including the EITE provisions, we estimate that net farm income would fall by an average $600 million per year in real 2005 dollars over 2012-18, less than 1 percent decline from baseline levels (table 5).[9]

Table 5—Effects of HR 2454 on Receipts, Expenses, and Net Farm Income, 2012-18 annual average, (billion 2005 $)

Item	billion 2005$	Percent change from baseline
Total receipts	0.0	0.0%
Total expenses	0.7	0.3%
Net farm income	-0.6	-0.9%

Totals may not add due to rounding.

[9] In absence of the EITE provisions, net farm income is estimated to fall by an average $1.3 billion annually over 2012-18, a decline of 1.8 percent from baseline levels.

Longer-Term Impacts on Agriculture

The USDA baseline only extends through 2018, which makes it impractical to conduct analysis over the full timeframe considered in the EPA analysis. In our medium-term and long-term analysis we assume the structure of the agricultural economy in the United States remains stable. That is, the role of energy in agriculture remains the same over time. The relation between energy-related expenses, other farm expenses, and the value of agricultural production stays the same.[10]

To assess the impacts of HR 2454 beyond 2018, we assume the underlying structure of the agricultural economy and the forces that shape the agricultural sector are similar to trends over the 2012-18 baseline period. For the medium term, we assumed the energy price increases estimated by EPA for 2027-33 and examined their effects over 2012-18. For the long term analysis, we assumed the energy prices increases estimated by EPA for 2042-48 and examined their effects over 2012-18.

An important difference between the medium and long term analyses and the short term analysis is that the EITE provisions are phased out beginning in 2025; thus, the full impact of higher natural gas prices are felt through higher fertilizer prices in the medium and long term analyses. The effects are thus proportionately larger.

Table 6 presents the impacts of higher energy prices on average annual production costs in the medium and long term and compares them to the impacts over the short term discussed above. Since the EPA analysis indicates that HR 2454 would have more pronounced effects on energy costs over time, the effects on agriculture are more pronounced in the medium and long term analyses. In addition to higher energy costs, the emissions allowances to trade exposed entities such as nitrogenous fertilizer manufacturers begins to expires in our medium and long term assessment. As a result, the medium and long term impacts on production costs have a relatively larger impact on fertilizer intensive crops such as corn compared to less fertilizer intensive crops such as soybeans. In the long run, *and assuming no change in production practices*, corn production costs could rise by $25.19 per acre, on average, in real 2005 dollars or 9.6 percent. In comparison, soybean production costs rise by only about $5.19 per acre, on average, in real 2005 dollars or 4.6 percent. Wheat, sorghum, barley and oats would see increases similar to corn in percentage terms. Rice would likely have the largest average per-acre increase ($28.08 in 2005 dollars), though its relative increase would be less than that for corn, wheat and the other feed grains. Likewise, cotton and soybeans would be affected, though the percent increase in operating costs is estimated less than 5 percent.

[10] Over the past 60 years, the relation between energy-related expenses and total farm expenses has been relatively stable. Our assumption may be a bit conservative with respect to the value of agricultural output, which has shown the relation between energy-related expenses and the value of agricultural production to have grown slightly. While history may not be a perfect guide to the future, it gives us no indication to believe our assumption of a constant relation between energy-related expenses and other agricultural indicators will change significantly.

Table 6--Estimated Impacts of Input Price Changes Due to HR 2454 on Per Acre Variable Costs of Production (in 2005 $, percent change from baseline in parentheses)

Crop	Near term	Medium term	Long term
Corn	1.19 (0.4%)	12.02 (4.6%)	25.19 (9.6%)
Sorghum	1.26 (0.9%)	5.45 (3.9%)	11.30 (8.0%)
Barley	0.70 (0.6%)	5.00 (4.1%)	10.44 (8.5%)
Oats	0.57 (0.6%)	4.12 (4.4%)	8.66 (9.2%)
Wheat	0.66 (0.6%)	4.94 (4.5%)	10.34 (9.5%)
Rice	3.09 (0.7%)	13.48 (3.1%)	28.08 (6.5%)
Soybeans	0.45 (0.4%)	2.50 (2.2%)	5.19 (4.6%)
Upland cotton	1.46 (0.3%)	7.90 (1.8%)	16.44 (3.7%)

Impacts on Total Receipts, Costs, and Net Farm Income

Table 7 presents the projected near, medium and long term impacts on farm cash receipts, production expenses and net farm income. Fuel, oil and electricity expenses are estimated to rise, on average, 22 percent above baseline levels in the long term while fertilizer and lime expenses are estimated to rise, on average, by almost 20 percent. While total receipts increase marginally—due to higher crop and livestock prices—they are not sufficient to offset the increase in farm expenses. As a result, net farm income is estimated to decline by as much as 7.2 percent from baseline levels.

Table 7--Estimated Impacts of Input Price Changes Due to HR 2454 on Net Farm Income (in billion 2005 $, percent change from baseline in parentheses)

Item	Near term	Medium term	Long term
Total receipts	0.0 (0.0%)	0.4 (0.1%)	0.9 (0.3%)
Total expenses	0.7 (0.3%)	2.7 (1.1%)	5.6 (2.2%)
• Fuel, oil and electricity	0.7 (6.4%)	1.3 (11.1%)	2.6 (22.2%)
• Fertilizer and lime	< 0.1 (0.3%)	2.0 (9.5%)	4.3 (19.9%)
Net farm income	-0.6 (-0.9%)	-2.4 (-3.5%)	-4.9 (-7.2%)

Accounting for Producer Adjustments to Higher Energy Costs and Increased Biomass Production Due to Higher Energy Prices

The medium to long term analyses are conservative given the observation that energy use per unit of output has declined significantly over the past several decades. Because of this, the estimates in table 7 are likely an upper bound estimate on the costs because they fail to account for farmers' ability to fully respond to changes in market conditions. In addition, our analysis is also conservative because it does not account for revenues to farmers from biomass production for bioenergy.

A number of studies have examined the effects of higher energy costs with models that allow for changes in production management practices and switching to bioenergy crops.[11] Based on the analysis of Schneider and McCarl, for example, allowing for changes in input mix and revenues from biomass production - but without accounting for income from offsets -, it is estimated that annual net farm income would increase in 2030 by about $0.6 billion or less than 1 percent. By 2045, annual net farm income is estimated to increase by more than $2 billion or 2.9%.

The Role of Offsets

HR 2454 would also provide opportunities for farmers and ranchers to receive payments for carbon offsets. EPA's analysis indicates that in 2020 agricultural lands would supply 70 million tons of CO_2e offsets through changes in tillage practices, reductions in methane and nitrous oxide emissions, and tree planting (afforestation). Existing forests would supply an additional 105 million tons of CO_2e reductions through enhanced forest management. By 2050, agricultural lands could supply 465 million tons of CO_2e reductions and existing forests supply an additional 178 million tons of CO_2e reductions. This could generate gross domestic agricultural and forestry offset revenues of $2 billion per year in real 2005 dollars in the near term, rising to about $28 billion per year in real 2005 dollars in the long term (table 8). Part of that revenue would be offset by the cost associated with implementing the specific type of practice used to reduce emissions or sequester carbon. USDA has not yet done this analysis, so we are unable to make a direct comparison of the magnitude of the net revenue from the offsets market and the estimated income loss due to higher input costs. EPA has conducted its own analysis of returns from offsets that take into account the costs of implementing land management practices. EPA's analysis projects annual net returns to farmers of about $1-2 billion per year from 2012-18, rising to $20 billion per year in 2050. It's important to note that EPA's analysis includes revenue generated from forest management offsets while USDA's does not. USDA's analysis strongly suggests that revenue from agricultural offsets (afforestation, soil carbon, methane reduction, nitrous oxide reductions) rise faster than costs to agriculture from cap and trade legislation. It appears that in the medium to long term, net revenue from offsets will likely overtake net costs from HR 2454, perhaps substantially.

---

[11] For example, see Schneider, Uwe A. and Bruce A. McCarl. "Implications of a Carbon-Based Energy Tax for U.S. Agriculture." Agricultural and Resource Economics Review 34/2 (October 2005): 265-279.;

Table 8--Estimated Gross Revenues from Offsets Associated with HR 2454 (in billion 2005 $)

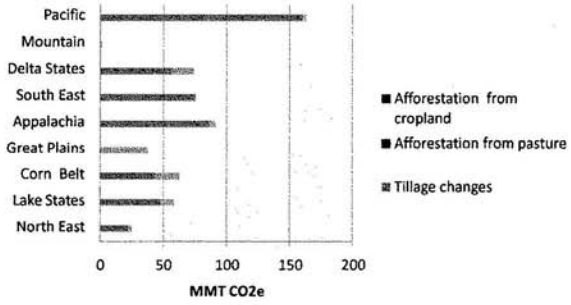
Item	Near term	Medium term	Long term
Afforestation and Soil Carbon	0.4	3.6	17.7
Methane and Nitrous Oxide Reductions	0.1	0.5	2.5
Forest Management	1.6	3.4	8.2
Total Offset	2.1	7.6	28.4

Source: EPA

Regional Considerations

Using a regional model of the U.S. agricultural sector, Lewandrowski et al. examined the potential for carbon sequestration at various carbon prices. At a carbon price of $34 per MT CO2e , they estimate that up to 101 million tons of CO2e could be sequestered through tillage practices and up to 488 million tons through afforestation (147 million tons from cropland and 342 million tons from grassland). Figure 4 shows the regional breakout of the potential carbon dioxide equivalent sequestered through afforestation on cropland and pastureland and through soil management at a carbon price of $34 per CO2e.

Figure 4—Carbon Sequestration Potential by Region (based on carbon price of $34/MT CO2e)



Source: Lewandrowski et al. 2004

Summary

The House climate bill will likely have small but significant effects on crop and livestock producers. Over the short run, impacts are largely negligible due to the EITE provisions of the

bill which would shield producers from the effects of higher natural gas prices on fertilizer prices. After 2025, however, fertilizer prices would likely increase. While energy-intensive crops will be most affected, the legislation also provides significant opportunities to offset increased costs through carbon sequestration activities. Our analysis does not assess the change in farm income due to the Renewable Electricity Standard provisions in HR 2454. Greater demand for renewable electricity will put upward pressure on the demand for biomass and provide an added source of farm income.

NATIONAL COMMISSION ON ENERGY POLICY

July 2009

Forging the Climate Consensus

Managing Economic Risk in a Greenhouse Gas Cap-and-Trade Program

Among the most important and contentious issues being debated as climate legislation advances in Congress is how to manage the economic impacts of a cap-and-trade program for greenhouse gases. On the one hand, businesses, consumers, and workers need assurance that a cap-and-trade program won't result in excessively high costs or excessively volatile energy prices. At the same time, any successful program must have economic and environmental integrity—not only in the sense that it achieves its long-term emissions objectives, but also in the sense that it generates the meaningful and reasonably consistent financial incentives needed to initiate and sustain investment in new, low-carbon technologies over time.

A variety of mechanisms aimed at satisfying these twin objectives have been proposed as the legislative debate on Capitol Hill has evolved. Some place greater emphasis on cost certainty, others on environmental certainty. The Waxman–Markey bill (H.R.2454), passed by the House of Representatives June 26, 2009 on a 219-212 vote, incorporates a number of sound ideas and provides a strong start toward successfully resolving the economic concerns that have stymied past efforts to develop national consensus around climate policy. In this issue brief, the Commission proposes strategies for further refining the bill's allowance reserve mechanism to ensure that it does not produce an unacceptable year-to-year escalation in allowance prices should mitigation costs prove higher than expected.

In the sections that follow we review elements of economic and environmental risk and uncertainty in the context of greenhouse gas regulation, discuss some of the advantages and disadvantages of the different approaches that have been proposed to manage these risks, and summarize NCEP's recommendations in the context of the current legislative debate.

Economic and Environmental Risk as Core Issues in the Climate Policy Debate

For more than a decade, inability to agree on the potential costs of carbon policies has played a large role in blocking progress toward political consensus on an approach for limiting greenhouse gas emissions. Early analyses of the cost of implementing the Kyoto Protocol varied widely depending on the assumptions and models used. Even studies conducted by different federal agencies varied considerably. For example, modelling by the White House Council of Economic Advisors in the late 1990s estimated that meeting the Kyoto Protocol target in 2010 would have cost $14 to $23 per metric ton of carbon dioxide (CO_2), while modelling by the Department of Energy showed costs as high as $95 per ton. When credible sources came to such divergent conclusions about cost, it became difficult for the public and members of Congress to sort through the conflicting information—and it became

impossible for proponents of mandatory emissions limits to muster a persuasive response to the jobs and competitiveness concerns of important stakeholder groups. The fact that similar disparities can be found in analyses of more recent climate-policy proposals points to the inherent difficulty of making predictions about the future, particularly when those predictions involve complex and dynamically inter-related social, economic, and technological factors. It also points to the importance of designing policies that can effectively manage risk without relying on the accuracy of any particular set of assumptions about the future.

In the 17 years since most nations, including the United States, pledged action to avoid "dangerous anthropogenic interference in the Earth's climate," cost has never receded as *the* core objection to implementing a policy that would impose mandatory limits on U.S. greenhouse gas emissions. Today, those same concerns are heightened by the extraordinary economic developments of the last 12 months. Increasingly, members of Congress from across the political spectrum acknowledge that climate change is an extraordinarily important problem that merits a serious policy response. But as momentum grows for legislative action, the argument is also being made that now is not the time—when the country is struggling to emerge from the worst economic downturn in decades—to impose additional costs on U.S. households or employers. Critics have focused especially on the potential for an increase in the price of gasoline and in the price of electricity, as the U.S. transitions from conventional coal and natural gas generation to cleaner electricity sources. Adding to these objections, the financial crisis has heightened concerns about the potential for manipulation or excessive speculation in new greenhouse-gas allowance markets.

As the Commission has argued elsewhere,[1] we believe that a well-designed cap-and-trade program that sets reasonable targets, evolves in a steady and predictable fashion over time, and provides effective safeguards against adverse impacts on low-income households and energy-intensive, trade-sensitive businesses can offer a robust response to these objections and will be far less costly in the long term than the alternative of continued delay. There is no question, however, that to win final passage a climate bill will need to deal convincingly with the underlying cost and risk concerns that have led to stalemate on this critical issue for far too long.

Managing different kinds of economic and environmental risk

One of the challenges to reaching consensus on climate policy design is that different stakeholders focus on several different types of economic and environmental risks. In general, economic risks fall into three categories: (1) long-term costs to the U.S. economy; (2) short-term costs and price volatility; and (3) costs to particular industries and competiveness impacts. This paper focuses on the first two of these categories because the responses that have been proposed in both cases fall under the broad rubric of "cost-containment mechanisms." The third category of economic risk—having to do with industry-level impacts and competitiveness concerns—is the subject of a separate, forthcoming NCEP discussion paper. It is likely to be addressed through a different set of mechanisms primarily having to do with allowance allocation, international technology deployment activities, and trade-related provisions. Finally, as we discuss later, there is also *environmental* risk associated with *lower* than expected costs, which could inhibit investment in long-lived, carbon-friendly technologies.

[1] Multiple prior Commission reports and staff papers can be found at www.bipartisanpolicy.org.

Past debates have tended to focus on the first category of concern: uncertainty about the magnitude of the long-term burden that climate mitigation will impose on the U.S. economy. This long-term burden or cost depends on the rate of technological change and innovation as well as on the effective deployment of existing technologies. For example, the development and deployment of new options such as carbon capture and storage could drive down the total cost of a greenhouse gas program. The effective deployment of existing technologies such as energy efficiency and nuclear power could similarly lead to lower costs. Efficiency policies (such as appliance standards), in particular, have generally proved quite cost-effective; these polices can substantially reduce upward pressure on allowance prices by reducing the rate of growth in energy demand. For this reason, complementary policies to accelerate the development and adoption of lower-carbon technologies and efficiency improvements *beyond* what would occur in response to a price signal alone—particularly in the early years of a cap-and-trade program—represent a further opportunity for reducing long-term costs and managing economic risk. On the other hand, to the extent that new technologies develop more slowly and institutional or other barriers to existing technologies are not overcome, costs could be higher than projected—perhaps substantially so.

Recent economic analyses suggest that long-term program costs can vary dramatically under different policy and technology assumptions. An analysis of the Waxman–Markey proposal by the Environmental Protection Agency (EPA) shows allowance prices ranging from $13 to $15 per ton in 2015. The availability of offsets has a significant impact on potential costs: EPA modeling of the Waxman-Markey bill shows that allowance prices double with no offsets. Similarly, EPA's analysis of S. 2191, the penultimate version of the Boxer-Lieberman-Warner bill projects that allowance prices in 2020 could be nearly 100% higher if there are constraints on the availability of key technologies such as carbon capture and storage, biomass, and nuclear power. For example, difficulty siting new facilities could delay the deployment of these technologies even if they are highly cost-competitive in the context of carbon constraints.

A second source of economic risk that has recently received more attention and that sometimes gets confused with the long-term cost issue concerns the potential for short-term price spikes and volatility in the allowance market. This volatility could be caused by a number of factors, including extreme weather conditions and developments in fuel markets. Changes in economic activity could also have an impact on allowance markets. Finally, some stakeholders are also concerned that excessive speculation or other market behavior could be a source of volatility.

Stakeholders have different perspectives on how and whether these different types of economic risk should be addressed. Although there are important nuances to the debate, one basic divide can be described as pitting a desire for economic (or cost) certainty against the desire for environmental (or emissions) certainty. On one side of the divide are stakeholders who believe a cap-and-trade program should be designed to minimize cost uncertainty—both in terms of long-term cost and potential price volatility. According to this view, industry needs assurance about the levels of investment in new technologies that will be needed so as to make economically efficient decisions about how best to reduce emissions. Consumers want assurance that energy bills will not rise unexpectedly due to a climate policy. Workers, particularly those in energy intensive industries that face international trade competition, want to know that the effects of carbon prices on competitiveness will be limited. These stakeholders point out that unexpectedly high costs or excessive price volatility will erode political

support and thereby undermine long-term confidence in the policy, and they emphasize the importance of consistent investment signals over achieving a particular emissions goal in some future year.

Other stakeholders have emphasized the need to maintain the environmental certainty that comes with a firm cap on greenhouse gas emissions. These stakeholders note that cap and trade is, by its very nature, a cost containment mechanism because it is designed to elicit the least-cost approach to reducing emissions.[2] They argue that it is important to safeguard emission reductions under the cap and therefore, a cost containment mechanism that sacrifices emissions certainty for price certainty should be avoided. They also point out that a cost-containment mechanism that would allow emissions to rise above the cap could prevent the United States from linking its cap and trade program to the European Union's Emissions Trading Scheme (EU ETS) or other trading programs with a "hard cap." With respect to the first argument, the Commission believes that including some mechanism for managing economic risk prior to the development of advanced technologies is vitally important—but that price certainty will give way to emissions certainty over time. The Commission also believes that a reasonable, temporary cost-containment mechanism is not a serious barrier to linkage with other systems.

Options for managing economic risk in the context of a cap-and-trade program

Banking and Borrowing: Although the cost issue has always been controversial in the climate legislation debate, certain mechanisms designed to manage economic risk have not been contentious. For example banking mechanisms allow sources to carry forward surplus allowances into subsequent compliance periods. Allowance banking can create a cushion that helps prevent price spikes and can hedge uncertainty in allowance prices. Banking is allowed in both the U.S. SO_2 and NOx programs and research has shown that it has reduced the costs of these programs. Borrowing mechanisms allow sources to use allowance allocations from future years to mitigate price spikes. Some proposals would require paying back an "interest rate" on borrowed allowances. Both banking and borrowing are effective mechanisms for managing short-term price volatility and both are included in the H.R. 2454. A variation on borrowing is the use of a multi-year compliance period, which would allow a source to use allowances from a subsequent year within a rolling compliance period without penalty. This approach is used in the Northeast States' Regional Greenhouse Gas Initiative, which has a three-year compliance period; it is also contained in Waxman–Markey, which has a two-year compliance period.

Price Cap: The simplest mechanism to address both long-term cost and short-term price volatility concerns involves capping the price of emissions allowances to ensure that the per-ton cost of mitigation actions required under the program cannot rise above a known level. Functionally, this can be achieved by government making an additional, unlimited quantity of allowances available for sale at a pre-determined price. This maximum price could rise steadily and predictably over time, for example by 5% per year above the rate of inflation. A price cap is a transparent way to give companies the regulatory certainty needed to optimize long-term investment decisions. On the other hand, a price cap does not guarantee that emissions targets will be met, since if prices rise high enough additional allowances will be sold that allow emissions to exceed the program cap. Ultimately, the level at which the price cap is set will determine the likelihood that this mechanism would be triggered. The farther

[2] Of course the debate is really about managing economic risks within a cap and trade program, rather than the relative cost-efficiency of a cap-and-trade program versus a command-and-control regime.

the price cap is set above the projected allowance price, the less likely it would be that unexpected developments would drive allowance prices to the level of the cap.

Offsets: Offsets— credit for emission reductions from sources outside the cap— could provide significant cost savings in a cap-and-trade program. Economic modeling of all the various climate bills has shown that an offset program could significantly reduce the costs of a cap and trade program. Offsets could also be a critical source of financing for the transition to a lower-carbon energy economy in key developing countries. However, while it is clear that there is the *technical potential* for offsets to significantly reduce costs, it is less certain how an offset program will actually perform—i.e., what the quality, timing, and quantity of available offsets will be. This is because there may be tradeoffs between the ability to guarantee that virtually all offsets are "additional" (i.e., deliver emissions reductions beyond business as usual) and the ability to provide offsets in significant quantities.

Ultimately, the role of offsets and their impact on cost will depend on a variety of factors. The rigorousness of project criteria and verification requirements will be among the most important factors. Standardized approaches would reduce transaction and administrative costs and could facilitate the approval of more offset projects and tons. But these approaches also raise the risk that projects that are not truly additional will make it through the process. In any event, even a streamlined offsets process would have a difficult time producing the number of offsets anticipated in some legislation. As noted in NCEP's overview paper, *The Case for Action*, to reach the 1 billion tons of offsets forecast for the Waxman–Markey bill in 2015, thousands of projects would need to be reviewed and approved over the first three years of the cap-and-trade program.

Because they are complex, the specific concerns and issues that apply to offsets as part of a cap-and-trade program design will be addressed in a separate NCEP discussion paper. The Commission's overall view of offsets is that they provide important benefits and should be an integral part of a cap-and-trade approach. But the Commission does not believe it is appropriate or realistic to rely on offsets as the primary mechanism for managing economic risk in the context of a mandatory climate policy. While the inclusion of offsets as an alternative compliance option gives emissions sources greater flexibility and can reduce short- and long-term costs, it also introduces an additional source of uncertainty since numerous difficult-to-predict administrative, environmental, and political factors will affect the supply of offset credits and ultimately allowance prices. Thus, it is important to consider whether other economic risk management mechanisms can provide greater assurances about the potential costs of a climate program.

Allowance Auction Reserve: H.R. 2454 also contains provisions for a "strategic reserve" allowance auction that would make additional allowances available through an auction that begins at a specified price. Allowances for the reserve are borrowed from future years, thereby maintaining the integrity of the cumulative multi-year emissions cap while providing some price certainty in the near-term. This approach differs from a simple price cap because only a limited number of allowances are available at the trigger price (or minimum auction bid). As a result there is no absolute guarantee, either that sufficient allowances will be available at that price or that the allowance price will not rise above the trigger price.

Following is an example of how an auction reserve would relate to allowance prices. If there were 500 million allowances available in the auction reserve in the first year starting at $25 per ton, one of three outcomes would be possible:

- First, there could be no sales from the auction reserve. This would happen if the prevailing market price for allowances was less than $25 per ton of CO_2. In other words, no one would bid on allowances starting at $25 if the market price was below this level.
- Second, there could be sales of less than 500 million allowances at $25 per ton of emissions. If demand for additional allowances was less than 500 million tons, then bidders would pay $25.
- Third, there could be sales of all 500 million allowances at a price above $25. If demand was great enough, then the price of allowances would be greater than $25 (but less than the noncompliance penalty cost per ton).

The example above highlights two factors that will determine how much price certainty is provided by the allowance reserve mechanism: the initial price of the reserve auction and the number of allowances available each year. It is important to note that the way in which the trigger price for the reserve allowance auction is set will determine whether the mechanism mitigates the potential for short-term volatility, higher-than-expected long-term costs, or both. For example, a strategic reserve of sufficient size would likely provide protection from short-term price spikes and volatility, but a trigger price structured along the lines of the Waxman-Markey bill would not protect against sustained higher-than-expected costs due to the unavailability of technology or other factors.

A description of the mechanism and a hypothetical scenario reveal why this is the case. Under Waxman Markey, the initial price for the auction reserve begins at $28 in 2012 and increases by 5% above inflation in 2013 and 2014. In 2015 and thereafter, the price is set at 60% above a 36-month rolling average of the allowance spot price.

According to EPA analysis, the expected allowance price in the early years of the program is roughly $14/ton CO_2e, or half the initial price for the reserve auction. For purposes of this example, however, assume that—perhaps because of technological failures or limited availability of offsets—the actual allowance price in 2012 is double the $14 price (i.e., $28), and assume further that the allowance price remains at $28 in 2013 and 2014. In 2015, the rolling average of the previous 36 months would equal $28 and the auction price would be 60% above $28, or roughly $49 per ton. In other words, the auction wouldn't be triggered until prices reached $49 per ton, or roughly three times the expected 2015 price. Further, if the average price over the previous three years is consistently higher than expected, then the auction trigger price will continue to be driven even higher. Indeed, costs could escalate rapidly as last year's high prices are factored into the rolling three-year average used as the basis for the next year's trigger price calculation.

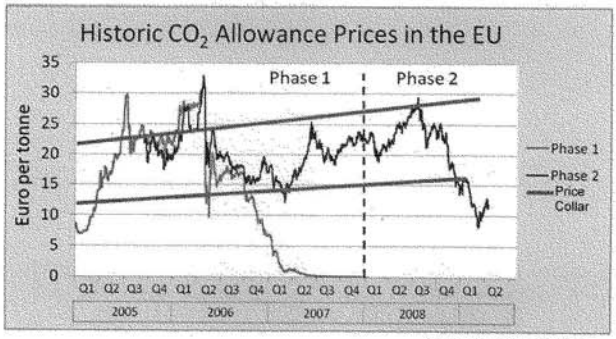
Because the reserve trigger price in later years is unpredictable and has this self-compounding feature, the allowance reserve as currently structured in Waxman-Markey is flawed as a mechanism for managing economic risk. It may provide some hedge against extreme spikes in allowance prices, but it will do little to protect the economy against sustained higher-than-expected mitigation costs in the event that low-carbon technologies do not become available on the scale or in the timeframe assumed by current forecasts, existing low-carbon technologies are deployed more slowly than expected, deployment costs are higher than projected—or some combination of all of the above.

Another important difference between a price cap and a reserve auction stems from the need to borrow allowances from future years to fill the reserve. To the extent that future year allocations are reduced to compensate for this borrowing, the long-term emissions constraint is not relaxed. Thus if technology does not develop fast enough, future costs could be higher because there will be fewer allowances. This potential effect is exacerbated if allowances are borrowed from earlier years. For example, Waxman-Markey withholds allowances for the reserve beginning in the very first year of the program. The reserve is filled with 1% of the allowances that would be allocated in years 2012 through 2019; 2% of the allowances for years 2020 through 2029; and 3% of the allowances for years 2030 to 2050. In contrast, the auction reserve in previous Senate proposals borrowed all allowances from the years 2030–2050.

Price Floor with Price Ceiling: Although most discussions of cost containment address the possibility that allowance prices will be higher than expected, it is also possible that allowance prices will be lower than expected. This has led some stakeholders to argue that a price floor along with a price ceiling should be considered. Why would prices be lower than expected? In past market-based regulatory programs, a variety of factors have caused lower than expected prices, including poor emissions data that have led to over-allocation of allowances, unexpected changes in fuel markets, technological developments, and slower-than-expected economic growth. Most recently, allowance prices in the first phase of the EU ETS dropped dramatically when it was discovered that there was an over-allocation of allowances to covered entities under the program. Lower-than-expected allowance prices have again surfaced in Phase II of the EU ETS because of much lower-than-expected economic growth.

In Figure 1 below, a hypothetical price collar is superimposed on historic EU ETS allowance prices to show how this mechanism would, in effect, smooth the price peaks and troughs and provide more certainty for investments in low-carbon energy infrastructure.

Figure 1: Limiting Volatility in the EU-ETS with a Price Collar



Source: Point Carbon

A "price collar" retains the economic efficiency benefits of a price ceiling alone, which has been shown to be nearly as efficient as a carbon tax.[3] Moreover, recent research has demonstrated that a "price collar" approach has the additional benefit of reducing long-term emission abatement costs relative to expected long-term abatement costs with a price ceiling alone. This is because the policy provides more consistent financial incentives for sustained investment in low-carbon technologies that can reduce compliance costs in the long run: Rather than being subject to boom-bust cycles when allowance prices fall, new low-carbon technologies would be assured a certain level of market stability. This would allow them to develop in a more orderly and ultimately cost-effective way.[4]

Put another way, a price collar tells investors that there will always be a significant pay-off to making long-lived facilities carbon-friendly. This has both economic and environmental benefits. Economic benefits accrue from avoiding investment in higher emitting technologies during periods when, for example, slow economic growth results in low allowance prices. If such investments go forward, allowance prices and costs could increase significantly when economic growth accelerates. Environmental benefits come from the earlier deployment of clean energy sources because the price floor creates incentives for a steady level of investment in low- and no-carbon technologies. This will help bring about a smoother and faster transition to a lower-carbon economy.

Automatic vs. Discretionary Mechanisms: A final variation on some of the mechanisms discussed above is to have a review board decide when prices have exceeded a level that is acceptable rather than setting a price up front. The advantage of this option is that it provides for a dynamic response to changing economic conditions that may affect allowance prices. Under various versions of this proposal, the board could increase the number of offsets allowed, could expand borrowing of allowances by affected sources, or could expand the system-wide allowances available in a strategic reserve provision. However, the disadvantage of this approach is that it would inject another form of uncertainty into the overall system. Although Congress could provide guidelines for when and how such a board would intervene, participants in the greenhouse gas market might have only a vague idea of how board decisions would balance cost versus environmental considerations. This could complicate investment planning and could lead to unexpected developments in emission markets.

Conclusions and Recommendations

The Commission has long taken the position that credible, transparent, equitable, and predictable mechanisms for managing the economic risks associated with a greenhouse gas cap-and-trade program are essential to the success and political viability of U.S. climate policy. A simple price cap that is paired with a minimum price floor and that escalates in a pre-determined manner over time still offers, in our view, the most straightforward and effective response to the cost concerns expressed

[3] "Limiting Carbon Dioxide Emissions: Prices Versus Caps," Congressional Budget Office Economic Budget Issue Brief, March 2005, P. 4. As acknowledged in previous Commission documents and in an extensive academic literature, considerations of macro-economic efficiency tend to favor a carbon tax with socially productive revenue recycling over other forms of regulation. As we have also long acknowledged, however, the political debate in the United States to date has strongly favored a cap-and-trade approach (this preference was evidenced most recently in the climate bill passed by the House).

[4] Fell H. and Morgenstern, R. "Alternative Approaches to Cost Containment in a Cap-and-Trade System," RFF Discussion Paper DP 09-14, April 2009, P. 23.

by many stakeholders, both with respect to long-term mitigation costs and with respect to mitigating the potential for short-term price volatility. An allowance reserve coupled with a price floor offers, in our view, many of the benefits of a simple price cap and has the not insignificant advantage of providing greater certainty about cumulative emissions reductions over the time horizon of the program.

To be effective as a mechanism for managing economic risk, however, the allowance reserve must be structured to reduce uncertainty, not add to it. In other words, the trigger price for the allowance reserve should rise over time in a transparent, pre-determined fashion (just as we would recommend for a straightforward price cap). We do not take issue with the initial allowance trigger price proposed in Waxman–Markey (at $28 per ton)—rather our concerns focus on the method used to calculate the trigger price in subsequent years.

Another issue that needs close attention concerns the size of the allowance reserve. If the quantity of additional allowances available through this mechanism is too small, it will provide only minimal leverage in managing economic risk. While NCEP has not undertaken a full analysis of this issue, our preliminary estimates suggest that roughly 6 billion tons of allowances should be available in the reserve to cover the first 10 years of the program.[5] A more rigorous effort to analyze the allowance reserve size needed to effectively address long- and short-term cost concerns is now underway and we urge Congress to take these results into consideration in refining future legislative proposals.[6]

An allowance reserve also raises the question of what to do with the revenues generated by the reserve auction. Under Waxman-Markey, the government would use proceeds from the auction to purchase forestry offsets that would replenish the reserve. Under this approach, the size of the reserve and the effectiveness of the cost-containment mechanism would depend on resolving some of the uncertainties associated with the evolving offset market. However, a better variation on this approach might be to have the government purchase offsets and use them to "pay back" the allowances borrowed from future years. This would reduce concerns that, as a result of borrowing to fill the reserve, future emissions caps might be too tight if technology does not develop as fast as expected.

In sum, a price floor coupled with a price cap, or a robust, well-designed reserve auction mechanism could be extremely useful for increasing public confidence in the nascent greenhouse gas market. If true costs are much higher than projected, the reserve would provide a "cushion" while Congress considers whether further program adjustments are needed. On the other hand, if allowance prices are in line with, or modestly above expectations, the allowance reserve auction would never be triggered. A well-designed auction reserve could also assist in making a smooth transition to a robust international offsets program. This is important because it will take some time before offsets can provide the program stability and cost-containment benefits envisioned in many current legislative proposals.

---

[5] This assumes that, on average, 300 million metric tons of offsets are available annually. Clearly, this is a conservative estimate regarding the availability of offsets. As noted above, we urge additional analysis on this issue.

[6] Building on the recent study by Fell and Morgenstern, Resources for the Future has recently begun work on a new study to examine the probability that a price ceiling or floor will be triggered and to estimate the size of the reserve needed to provide reasonable certainty that the allowance reserve mechanism will be effective.

Likewise, NCEP believes that strong oversight of the new greenhouse gas market is a priority, but that it could take some time before a full and comprehensive oversight regime is in place. For all of these reasons, designing a reliable, reasonably simple, and effective approach to managing economic uncertainty *from the outset* will be critical to ensuring that a new U.S. climate policy achieves meaningful environmental results and commands broad support from policy makers, key stakeholders, and the American public.

The Members of the National Commission on Energy Policy are:

William K. Reilly *Co-Chair,* Senior Advisor, TPG, Inc.; Former Administrator, U.S. Environmental Protection Agency
John W. Rowe *Co-Chair,* Chairman and CEO, Exelon Corporation
Susan Tierney *Co-Chair,* Managing Principal, The Analysis Group; former Assistant Secretary of Energy
Philip R. Sharp *Congressional Chair,* President, Resources for the Future; former U.S. Representative, IN
Marilyn Brown Visiting Distinguished Scientist, Oak Ridge National Laboratory; Professor, School of Public Policy, Georgia Institute of Technology
John E. Bryson Chairman, President and Chief Executive Officer Edison International and Chairman, Southern California Edison
Ralph Cavanaugh Senior Attorney and Co-Director, Energy Program, Natural Resources Defense Council
Erroll B. Davis Jr. Chancellor of the University System of Georgia
Senator Rodney Ellis State Senator, TX
Leo W. Gerard International President, United Steelworkers of America
Robert E. Grady Managing Partner, Carlyle Venture Partners, The Carlyle Group and former Executive Associate Director of the OMB
F. Henry Habicht Managing Partner, SAIL Venture Partners, LLC; Former Deputy Administrator of the U.S. Environmental Agency
Richard A. Meserve President of the Carnegie Institution and former Chairman of the U.S. Nuclear Regulatory Commission (NRC)
Mario Molina Professor, University of California, San Diego
Sharon L. Nelson Chair, Board of Directors, Consumers Union; Former Chief, Consumer Protection Division, Washington Attorney General's Office
Richard L. Schmalensee Howard W. Johnson Professor of Economics and Management and John C Head III Dean, Emeritus, Sloan School of Management, Massachusetts Institute of Technology
Norm Szydlowski President and Chief Executive Officer of Colonial Pipeline
R. James Woolsey Vice President, Booz Allen, Hamilton; former Director of Central Intelligence
Martin B. Zimmerman Clinical Professor of Business, Ross School of Business, University of Michigan; Group Vice President, Corporate Affairs, Ford Motor Company (2001 - 2004)

Jason Grumet, Founder and President of the Bipartisan Policy Center and Executive Director of the National Commission on Energy Policy

CountryMark

Submitted testimony for the U.S. Senate Committee on Agriculture, Nutrition and Forestry

Congressional hearing to review "The Role of Agriculture in Global Warming Legislation"

July 22, 2009

As Congress proceeds with consideration of Climate Change legislation, CountryMark believes it is important for Congress to know about the companies this legislation will impact. It is also important for Congress to understand how this legislation as currently drafted will affect companies such as CountryMark.

CountryMark's History

CountryMark's history dates back to the 1920s, when several local Indiana farmer owned cooperatives joined together to collectively purchase lubricating oils for their farm equipment. By 1930, 77 of these farmer owners formed the Indiana Farm Bureau Cooperative Association (IFBCA).

With the discovery of oil in the Illinois Basin in the late 1930's, IFBCA's farmer-directors saw the need for better quality and more reliably supplied fuels. In pursuit of these goals they began construction of an IFBCA financed refinery in southwestern Indiana. The selected location was ideally situated between the Illinois Basin crude oil fields and the Ohio River barge traffic.

Refinery construction was completed in 1940 and crude processing of 2,500 barrels per day (BPD) (35 million gallons per year) started in April of that same year. IFBCA's initial investment was $330,000 for the refinery, crude oil pipelines, and truck fleet. At the time, the new farmer owned cooperative had 60 employees and anticipated annual sales for refined products of $1 million.

By the late 1940s, IFBCA was fully involved in drilling for crude oil, refining crude oil into fuel, and distributing its end products to its farmer owners. In the 1950s, IFBCA's operation expanded to justify construction of a 238-mile proprietary pipeline. The pipeline was constructed to better transport and distribute refined products from the refinery in Mt. Vernon, Indiana through the Indianapolis area and north to Peru, Indiana. CountryMark's flagship product, *Super Dieselex-4*, was introduced to the agricultural

market in 1961. The current version of this fuel remains the company's marquee product today.

Eighty nine years later, CountryMark owns and operates over 400 miles of crude gathering pipelines serving the Illinois Basin, a 26,500 BPD (400 million gallons per year) refinery, and a 238-mile proprietary pipeline – as well as five product terminals. Since IFBCA's refinery investment in 1940, CountryMark's assets have grown to nearly $600 million. CountryMark now employs approximately 350 people and in 2008 annual sales were $1.3 billion.

CountryMark fuel and lubricants are delivered daily to individuals, companies, farms and government entities throughout Indiana and the neighboring states of Michigan, Ohio, and Illinois. CountryMark's fuel products power approximately 75% of Indiana's production agriculture industry as well as about half the public school buses that deliver Indiana children to school each day.

Over the years, CountryMark's facilities and processes have been updated as fuel technology and refining innovation have occurred. CountryMark has actively promoted the growth and adoption of renewable fuels. CountryMark has been a long time proponent of ethanol blended gasoline, and the majority of CountryMark gasoline contains ethanol. Also, in partnership with Indiana's soybean growers CountryMark is the state's leader in the offering of biodiesel. In fact, the Central Indiana Clean Cities Alliance estimates that in 2008 85% of all biodiesel sold in the state was sold at one of CountryMark's four Indiana petroleum terminals. By focusing on the integration of American sourced petroleum and biofuels, CountryMark has emerged as a recognized leader within the Indiana energy industry.

CountryMark - A Legacy of American Energy

CountryMark is Indiana's only American-owned oil refining and marketing company and is recognized nationwide as a leader in the distribution of biodiesel and ethanol.

CountryMark fuels are all-American fuels. The CountryMark refinery uses 100% American crude oil sourced from the Illinois Basin, a 53,000 square mile depression underneath most of Illinois, western Indiana, and western Kentucky. This light, sweet, American crude oil, domestically refined, helps reduce dependency on foreign oil, strengthens domestic energy security, and fuels the American production agriculture economy.

Our fully American operation produces an important financial consequence in our region as well. By sourcing American crude oil, more money remains here in the Midwest supporting our local economies. CountryMark purchases over 9.5 million barrels of crude oil per year. In 2008, that meant $800 million went into the Indiana, Illinois, and Kentucky economies. This money constitutes revenue in the Midwest economy to over 40,000 people and supports employment of over 14,000 in Illinois alone, and as many as 20,000 people in the tri-state area. Since none of the major oil companies operate in the

Illinois Basin, CountryMark has emerged as the dominant purchaser of the area's crude. To support continued development of this American resource, CountryMark recently began partnering with local oil producing companies to invest in additional well drilling.

CountryMark's operations employ 350 workers, nearly all in the rural economy of southwest Indiana and southeast Illinois. In Posey County, Indiana alone, nearly $27 million in wages and benefits are provided every year. These wages are over twice the local average and are paid mostly to hourly workers with little or no opportunity for other employment equivalent to CountryMark. In addition to the positive financial impact of CountryMark's crude purchases and payroll, the company placed over $200 million into the local economy for the purchase of other goods and services.

CountryMark's Cooperative System

Unlike most other fuel refiners, CountryMark is a cooperative business. CountryMark is owned and controlled by its member cooperatives that are in turn owned and controlled by individual farmers within our trade territory. Over 100,000 farmers in Indiana, Michigan, and Ohio participate in these local cooperatives who own CountryMark. CountryMark's Board of Directors is comprised of farmers. Each year, profits are distributed back to these farmers via the cooperative system. Over the past five years, CountryMark has returned over $90 million to the member cooperatives. These distributions remain in local communities where the dollars support the local economy. This annual distribution of profits represents a critical financial connection between CountryMark, our member cooperatives, and the 100,000 farmer-owners that have equity in the cooperative system.

Beyond distribution of profits, CountryMark represents a significant capital investment by our regional farmer-owners. The ownership of gasoline and diesel manufacturing represents vital, vertical integration of farmer's production agriculture operations. This investment by CountryMark's farmer-owners represents a time honored business model of joining resources for the common purpose of purchasing vital goods and services in a manner they simply couldn't do individually.

CountryMark's cooperative purpose is to produce and wholesale gasoline and diesel fuel for retail sale through the local member farmer cooperative network. Due to this mandate, we have a unique mission compared to the conventional oil refineries in the country. This mission is the core meaning of farmer cooperative ownership. As said by one farmer, "When it is time for the combine to run, the fuel had better be available." This was never more apparent than during hurricanes Katrina and Rita early in the harvest season of 2005. At a time when much of our nation's refining capacity was crippled, every single farmer co-op member was able to get the fuel they needed to operate their farm equipment. CountryMark will remain critical to farmers as they lead America's transition to bio-fuels.

Simply put, CountryMark's cooperative purpose is to supply vital goods and services to farmers. CountryMark's mandate is to supply these fuel needs even when purely capitalistic market forces might dictate otherwise. The needs of our farmer-owners are our single organizing principle. CountryMark was created to exclusively meet these needs, and our cooperative ownership ensures fidelity and accountability to our farmer-owners, not external shareholders. As a result, our farmer-owners unquestionably rely upon CountryMark for goods and services necessary for production agriculture, profit sharing, and repurchase of ownership once the farmer retires from operation.

Impact of Cap and Trade Legislation

As one of the country's smallest refineries, CountryMark has built a durable operation by disciplined capital spending, controlling operating costs, and providing value-added goods and services to our farmer-owner customers. However, our resources do not provide a cushion to absorb climate change costs. We compete with much larger multinational oil companies with substantial earnings from oil production, petrochemical manufacturing, and other highly diversified operations. To provide perspective, CountryMark represents 0.15 percent of the total U.S. refining industry's capacity. However, climate change legislation as drafted provides no distinction between these large, multinational companies and very small, farmer-owned companies like CountryMark. If the pending legislation passes without recognition of the different financial capabilities of these two segments of our industry, the first casualty will be companies such as CountryMark that today are one of only a few petroleum refiners providing 100% American energy to the marketplace.

Climate change legislation is the single biggest threat to the viability of CountryMark and the investment of our farmer cooperative owners. Our latest estimate, based on the Waxman-Markey Climate Change bill as reported by the House Commerce Committee, is that the cost of carbon taxes on CountryMark will exceed $100 million per year for both our direct manufacturing emissions and emissions produced from consuming our product. This burden, compared to our average annual net income over the past five years of $37 million per year, clearly indicates the magnitude of the current legislation's impact on our economic sustainability.

If required to purchase allowances exceeding $100 million per year CountryMark could be rendered insolvent. The end of CountryMark as a business would not only deprive our Midwest economy of the investments described above, but would even more significantly, seriously impair our farmer-owner cooperatives' balance sheets. The insolvency of CountryMark would trigger a cascade of financial doubt through the farmer cooperative system. CountryMark bankruptcy would require the write down of currently

viable assets on the cooperative system's books. Local cooperatives, which in turn would be impacted by the loss of equity, would see their ability to borrow money, at a time of economic stress due to volatile input prices, undermined. The violence of these economic forces could drive local cooperatives out of business, which in turn would significantly impair farmer's ability to pursue their livelihood. As a result of this cascade, the currently drafted climate change legislation threatens the basic farmer cooperative system.

Such a financial series of events would have far-reaching consequences for production agriculture and our national economy, and must be avoided. CountryMark bankruptcy and the financial damage to our farmer cooperative system will not be the end of the impacts felt on our nation's future. The survivability of the farmer cooperative system, and CountryMark, is vital to the development and implementation of future renewable fuels.

The reality of a viable renewable fuels industry is that it will be regional in nature. Transportation of both renewable feed stocks and fuels will be vital in ensuring economic sustainability well into the future. Renewable fuels production will not develop along the lines of the centralized petroleum refining in the gulf coast, where crude oil is pumped or shipped vast, distances to be refined. To keep the cost of bio-fuels low for consumers, efficiency will be important. Production facilities will need to be close to both the feed source and the product distribution network. CountryMark and our cooperative members are well positioned to participate in the regional renewable fuels industry. CountryMark is already a recognized leader in renewable fuels distribution in the nation. Cap and trade legislation as proposed in HR2454 will force an undue economic burden on CountryMark, forcing our company into insolvency. If this is allowed to happen, a key contributor to the future renewable fuels industry will be lost forever.

The legislation as currently drafted will also reduce the quantity of diesel fuel available to the marketplace. The legislative proposal focuses on increasing availability of ethanol fuels to replace petroleum based gasoline. However, today there is no comparable technology to produce enough renewable diesel fuel to replace the large volumes of diesel fuel now used within the nation's economy. By raising the cost of petroleum gasoline through cap and trade, less of it will be consumed. This will reduce crude through-put rates in the nation's petroleum refineries, necessarily reducing the co-production of conventional diesel fuel. This will disproportionally increase diesel fuel prices, significantly impacting diesel consuming industries such as U.S. production agriculture.

Similarly, nearly all of the federal Renewable Fuel Standard is focused upon ethanol as a replacement for gasoline. However, the commercial viability of a suitable diesel fuel replacement is years behind the ethanol curve. Furthermore, renewable fuels standard regulations virtually eliminate the viability of increasing the use of soy based diesel fuels because of the alleged impact on worldwide land use changes.

In the end, this legislation will increase the cost and decrease the supply of diesel fuel that is vital to our rural economy and negatively impact the local family farms that Americans are counting on to supply the renewable bio-based feed stocks for the renewable fuel industry.

CountryMark urges Congress to reject this legislative proposal and re-think the important strategies needed for this nation to reduce its carbon emissions, develop viable renewable gasoline and diesel fuels, and avoid destruction of critical aspects of our economy in the process. The legislation as currently drafted does not achieve these goals. These goals are however achievable, through a transparent and practical dialogue with America's Production Agriculture Industry, we can succeed. The current draft of cap and trade legislation unnecessarily risks destroying the famer-cooperative system, of which Country Mark represents a major success.

Written Statement of James Borel
Group Vice President, Agriculture and Nutrition
E.I. DuPont de Nemours and Company, Inc

Before the Senate Agriculture Committee
Regarding the Role of Agriculture and Forestry in Global Warming Legislation

July 22, 2009

Dear Chairman Harkin, ranking member Chambliss and members of the Senate Agriculture Committee:

Thank you for the opportunity to share DuPont's views on the role of agriculture in energy/climate change legislation. My name is Jim Borel, and as Group Vice President for DuPont Agriculture and Nutrition, I represent numerous DuPont businesses that all contribute to agricultural prosperity. These businesses invest more than $600 million dollars annually, developing scientific innovations to make farming more profitable, sustainable and better for the environment.

At DuPont, we feel we have something of a unique perspective due to our breadth of engagement in agriculture. Our seed company, Pioneer Hi-Bred, delivers superior yields to farmers through superior seed genetics coupled with native and transgenic traits. We provide an array of effective crop protection products to protect crops from insects, diseases and weeds. Through our Solae joint venture with Bunge we produce highly nutritious soy protein for the food market. And we are developing technology to convert cellulosic feedstocks to ethanol and starch to biobutanol, a high performance biofuel.

We recognize the potential business and environmental implications of climate change, which led us to become a founding member of the U.S. Climate Action Partnership (USCAP). Through USCAP we are advancing climate change policy solutions that are environmentally effective and economically sound. In addition to voluntarily reducing our own greenhouse gas emissions substantially over the past 20 years, we are committed to helping our customers reduce their environmental footprint by providing superior products, technologies and agronomic advice. We continue to use science and service to deliver better solutions for our customers and the environment.

For example, over the past two decades, improvements in corn seed, agronomic practices, crop protection products and traits have increased U.S. yields per acre by more than 41 percent. And while dramatically increasing corn's productivity, U.S. farmers have on average decreased their per bushel water use by 27 percent; energy use by 37 percent; soil loss by 69 percent; and greenhouse gas emissions by 30 percent.[1]

---

[1] Field to Market, The Keystone Alliance for Sustainable Agriculture, 2009

DuPont and Pioneer, which holds a unique position in the history of U.S. agriculture and hybrid seed development, are proud to have contributed significantly to those measurable improvements through enhanced plant breeding for drought tolerance; molecular stacks of traits to protect plants from yield-robbing insects; aggressive producer education to improve planting and mid-season farming practices; and the complimentary offering of innovative agricultural services, such as GPS field mapping to better understand soil types, which conserves the use of nitrogen, a common fertilizer. Probably the most visible result of these agricultural innovations is the rapid adoption of no-till farming, which saves tractor trips across a field, significantly reducing soil compaction and soil run off and decreasing fuel use. The result is cleaner water and reduced carbon emissions.

Currently, our researchers are developing corn seed that will use nitrogen (a fertilizer) more efficiently. The goal is for corn seed containing this unique trait to maintain yields using less nitrogen, or to dramatically increase yield productivity using current nitrogen levels. Since nitrogen is one of the largest input costs for growers in corn production—typically accounting for at least 20 percent of variable costs depending on crop rotation—decreasing the amount of nitrogen required presents farmers with an opportunity to reduce their carbon footprint while improving their profitability through reduced input costs per bushel of corn produced.

Each generation of Pioneer brand corn seed is better able to tolerate periods of drought. For more than 80 years, our researchers have been selecting and breeding for drought tolerance. And through the use of molecular markers and other cutting-edge technologies, our scientists are racing to identify the complicated combination of drought genes that will significantly reduce the need for irrigation systems. Transgenic drought traits will further reduce agriculture's environmental footprint and enable developing countries to become more self-reliant in producing the food required to feed themselves within their own borders and to improve their economies.

Potential environmental breakthroughs are seen in our soybean research efforts as well. For example, in addition to providing nutritional benefits by replacing hydrogenated oils that contain trans fatty acids, our high oleic soybeans provide a renewable and environmentally friendly option to petroleum-based products in a number of industrial applications.

Agriculture has a critical role to play in providing feed, food and energy to a growing world, and can contribute significantly to reducing our dependence on fossil fuels. At the same time, it is important to recognize that the coming decades will place significant demands on agriculture to expand production to provide both food security to growing populations with improving diets and low carbon energy to an energy hungry world. Ensuring adequate food production—especially among chronically food insecure populations—is a critical component to food security and, ultimately, global political stability. It is important that policies assist, rather than impede, this expansion in agricultural production.

As the Senate takes up energy and climate legislation it is important that both the economics and the policy framework of the bill allow agricultural producers to meet these challenges. Addressing climate change in a manner that hampers our ability to feed the world would not constitute progress.

Two key factors required for this pending climate change and energy legislation are for 1) the benefits to outweigh the costs to producers and their communities and for 2) any climate change policy developed to be consistent with agriculture policies such as domestic farm programs and international trade policies.

Climate and energy legislation can translate to higher input costs for producers, in particular for fuel and fertilizer. And those costs could exceed the potential revenues from offsets such as carbon sequestration or conversion of wastes to energy. If producers' costs rise, their competitiveness in global markets is eroded, which could lead to reduced U.S. agricultural production and rising food costs. It is imperative that climate legislation ensures a variety of revenue opportunities for agriculture producers including not only offsets, but such opportunities as wind, solar and bioenergy production to allow them to balance rising costs.

The effects of rising input costs in the face of offshore competition were recognized for the manufacturing sector in the House bill, and were addressed through allowance allocations. Agricultural producers face the same challenges. In many cases they sell products into a global market where prices are set on global exchanges, limiting their ability to recover increased production costs. The House bill does not provide similar allocation measures to address competitive impacts on agriculture, which places greater emphasis on the availability of sufficient revenue opportunities to offset rising costs. It is critical the Senate legislation ensures sustainable economics for U.S. agriculture.

Regarding policy, it is important that climate legislation work effectively with other farm and trade policies to ensure U.S. agriculture can continue to lead the world in productivity, while contributing to greenhouse gas reductions. For example, the legislation should include the use of agricultural offsets as part of cost containment, with USDA overseeing the development of those offsets. As a coalition of farm groups noted in a set of policy principles in March, "USDA has the statutory authority provided in the 2008 Farm Bill, the institutional resources and the technical expertise necessary to create and administer an agricultural offset program that works for production agriculture. USDA has a track record of working with farmers as well as studying, modeling and measuring conservation and production practices that sequester carbon and that promote appropriate manure management and nutrient application on agricultural lands. USDA should be given adequate flexibility in implementing the offset programs that allows them to account for new technologies and practices that emerge, which result in emission

reductions from agricultural sources."[2] We believe U.S. agriculture, working with USDA, can serve as a source of high quality offsets.

Legislation should also support expanded agricultural research that will assist both with agricultural greenhouse gas reductions and adaptation to a changing climate. As previously noted, yields have significantly improved the past 40 years as the result of research and breeding programs in public and private institutions. We believe continuing to invest in agricultural research—public and private—will lead to the next generation of technology breakthroughs and productivity gains required to meet environmental challenges and global food and fuel needs. It is widely recognized that technology will be a critical element of moving the U.S. and the world to lower carbon emissions, while allowing for robust economic growth—a prerequisite for our ability to effectively reduce carbon. The focus on research, development and deployment must include agriculture.

We encourage the Senate to address a policy element that was dealt with in the House bill which, if unaddressed, could prove to be an impediment to meeting global food needs—the designation of "indirect land use" in the context of the Renewable Fuels Standard. We recognize the concern that the rapid expansion of biomass as an energy source could potentially, if not properly managed, create pressures for land transformations and have negative environmental consequences—the concern that drives the "indirect land use" concept. Tropical deforestation is a significant current source of greenhouse gas emissions, and other land conversions can have similar effects. However, the concept of indirect land use is a particularly poor policy tool to address this concern and could unduly constrain agricultural activities. There are better, more effective tools to address land issues.

Because these purported indirect effects are theoretical, second- and third-order consequences of changes in agricultural economics, it's essentially impossible to connect any given action, e.g., increased grain demand for biofuels in the U.S., directly to a given land use change elsewhere, e.g., logging in Brazil. There are also questions of fundamental fairness. Many development activities in the U.S. affect the use and productivity of agricultural land, including agricultural land lost to development for schools, residential developments, shopping malls and roadways. Changing demand in global agricultural markets also affect how U.S. agricultural land is used. And yet, of all of these factors, only the demand associated with U.S. biofuel production would be regulated on the basis of indirect land use effects. To apply indirect land use concepts in a U.S. policy is to hold U.S. producers responsible for activities over which they have no influence and cannot be attributed directly to their actions.

Perhaps most importantly, because of the inherent nature of indirect land use concepts, it seems highly improbable that we could ever determine if constraints placed on U.S.

---

[2] Principles for Greenhouse Gas Legislation, March 20, 2009. AFT, ASA, NACD, NAWG, NCBA, NCGA, NCFC, NFU, NMPF, PLC, UFPA, WGA.

agricultural activities in the name of indirect land use were having their intended effects. The idea that we would burden domestic agriculture on a theoretical basis, with no means to determine effectiveness, seems to be deeply flawed public policy.

Instead, our policies should seek more direct tools to address the very real issue of deforestation and other land conversions, such as the creation of offset credits for avoided deforestation. Constraints on the sourcing of feedstocks that restrain these activities, something that already exists in bioenergy policies, are another useful tool. And bilateral programs with governments of nations where these land conversions are taking place, can also be effective and are underway. Given the availability of these direct, more effective policy options, we see little reason to recommend the inclusion of indirect land use as a policy element.

In closing, we encourage you to develop climate change and energy legislation that is environmentally effective and economically sustainable, and helps the U.S. producers continue to provide a safe, abundant and inexpensive supply of food for the world. DuPont will continue to do its part, working not only to further reduce our own environmental footprint, but also by using our science to bring new products to market to help other entities reduce their emissions. In addition to providing agricultural innovations through improved seed and crop protection products, our sustainable solutions contribute to the growing alternative energy market in windmills, photovoltaic solar cells and next generation biofuels. We create value-adding materials produced from agricultural feedstocks rather than petroleum, like our DuPont™ Sorona® polymer, and products that enable greater energy efficiency, such as next generation refrigerants and DuPont™ Tyvek® HomeWrap®.

Effective climate legislation will provide companies like DuPont the certainty we need to increase our investment and accelerate development and deployment of technologies that will be critical to a low-carbon economy. DuPont is committed to working with you and your colleagues to do our part to reduce greenhouse gases, while helping our nation's agricultural producers meet global food and fuel needs.

Thank you for the opportunity to represent the viewpoints of DuPont on this important topic.

July 20, 2009

The Honorable Tom Harkin
Committee on Agriculture, Nutrition and Forestry
United States Senate
Washington, DC 20510

The Honorable Saxby Chambliss
Committee on Agriculture, Nutrition and Forestry
United States Senate
Washington, DC 20510

Dear Chairman Harkin and Ranking Member Chambliss:

We write in support of the inclusion of biochar as part of a robust agricultural and forestry offset program in any climate change and energy bill to be considered by the U.S. Senate. Scientific research indicates that biochar production and application has tremendous potential not only for greenhouse gas (GHG) mitigation but also for providing tangible economic benefits for American farmers.

Potential for GHG Mitigation

Biochar is a carbon-rich product created when biomass is heated in a closed container with a reduced amount of oxygen. This process is called pyrolysis, and it can use a wide variety of feedstocks such as urban, agricultural or forestry biomass residues, including wood chips, corn stover, rice or peanut hulls, tree bark, paper mill sludge, animal manure, and recycled organics. Upon pyrolysis at relatively low temperatures of 300-600°C, the chemical properties of biomass carbon change to form structures that are much more resistant to microbial degradation in comparison to the original organic matter. Thus, materials that would rapidly release carbon dioxide (CO_2) as they decompose are transformed into a material that degrades much more slowly, thereby creating long-term carbon sinks. Such thermally altered material is about 1.5 to 2 orders of magnitude more stable in soils than uncharred organic matter. Biochar has mean residence times of several hundreds to several thousands of years in soils.[1] Additionally, biochar use as a soil amendment can reduce the need for fertilizer applications. Fertilizer production is a very energy-intensive process, and thus, reducing the need for it can also contribute to decreasing GHG emissions. Conservative modeling of the technical potential of biochar production and

[1] Written Testimony of Johannes Lehmann before the House Select Committee on Energy Independence and Global Warming (June 18, 2009), p. 1.

utilization indicates it can produce ***on the order of 1 Gigaton (Gt) of carbon removal annually by 2050***.[2]

In addition to serving as a carbon sink, biochar production and application can reduce non-CO_2 GHG emissions, including nitrous oxide (N_2O) and methane (CH_4). Small reductions in the emissions of N_2O and CH_4 would provide significant benefits in fighting climate change, because the warming potential of these GHGs are 298 and 25 times greater, respectively, than the equivalent mass of CO_2 in the atmosphere.[3] Research indicates that biochar application to soils may significantly reduce N_2O and CH_4 emissions from such soils. Also, the conventional management of biomass wastes, such as urban green wastes and animal manures, often leads to the production and release of N_2O and CH_4. Biochar production systems can use these feedstocks to produce biochar while also reducing the emissions of N_2O and CH_4 that would have otherwise occurred with traditional management of these wastes.

Economic Potential for Biochar Production and Application

Biochar systems offer significant economic potential for our country's farmers, including benefits associated with energy production, soil improvement, job growth, and waste management.

Biochar production generates valuable by-products, which creates economic opportunity for farmers. For each unit of energy invested during the life cycle of various biochar systems, between 2 and 7 units of energy can be produced.[4] Biochar has been sold for $480 (net) per ton for its value as a fertilizer.[5]

Scientific research shows that biochar application may increase crop yields. An analysis of potential effects of biochar application in the U.S. Corn Belt estimated a net value through both yield increases and input savings as $143.4 ha^{-1} annually.[6] Biochar application to soil can also produce input savings for farmers due to reduced nitrogen leaching and increases in crop productivity, which could result in 20 percent savings in fertilizer and 10 percent savings in irrigation and seeds.[7]

Additionally, biochar application can result in savings from reduced energy consumption and fertilizer uses. Generally, fertilizer prices rise in conjunction with energy prices because fertilizer production is very energy intensive. Thus, the agriculture sector is very vulnerable to

---

[2] Ibid, at p. 4.
[3] Van Zwieten, L., Singh, B., Joseph, S., Kimber, S., Cowie, A., and Chan, Y.K. (2009) "Biocahr and Emissions of Non- CO_2 Greenhouse Gases from Soil," *Biochar for Environmental Management*, p. 227.
[4] Written Testimony of Johannes Lehmann before the House Select Committee on Energy Independence and Global Warming (June 18, 2009), p. 3.
[5] Lehmann, J., and Joseph, S., (2009)"Biochar Systems," *Biochar for Environmental Management*, p. 157.
[6] McCarl, B.A., Peacocke, C., Chrisman, R., Kung, C., and Sands, R.D., (2009)"Economics of Biochar Production, Utilization, and Greenhouse Gas Offsets," *Biochar for Environmental Management*, p. 350
[7] Ibid, at p. 349.

increases in energy prices. With regard to energy savings, farmers can use the bioenergy produced by biochar production to displace their use of traditional fossil fuels and enjoy significant savings. One study showed that a West Virginia farm realized annual savings of $66,000 just by capturing the thermal heat produced by a biochar production system, which offset the need for 114,000 liters of propane gas to warm poultry barns.[8]

The deployment of biochar production systems made with locally produced pyrolysers or gasifiers could create jobs in rural economies independent of any particular impact on soil quality or crop yields. The National Soil Tilth Laboratory of the United States Department of Agriculture is currently studying the effects of biochar application to soil and stated that "pyrolysers are relatively inexpensive and can be financed locally." Thus, utilization of "pyrolysers will bring jobs and entrepreneurial opportunities to rural communities and allow a greater portion of the revenue to be retained by those communities."[9] Many rural communities are struggling, and biochar production systems could provide an economic boosts for these areas.

Finally, biochar provides a value stream through effective waste management. Biochar can be produced from a variety of feedstocks that might otherwise constitute a financial or environmental liability. Examples include animal manures in agricultural regions with high phosphorus and nitrogen loadings, green wastes that may generate nitrous oxides or methane during land fill, or biomass from forest thinning for fire prevention. Biochar producers using such feedstocks may even be able to realize tipping fees for disposing of such wastes.[10]

Current Science and Hurdles to Widespread Implementation

While few fully implemented modern biochar systems exist world-wide, the necessary engineering and science capacity is available to evaluate a diverse set of biochar systems at scale of implementation in the near term. In fact, biochar science has rapidly evolved even over the past 12 months. Evaluation does not rely on a fundamental advance in science, but on application and adaptation of existing science.

There are, however, hurdles to the development of a first-generation biochar market, which include the absence of a domestic carbon market. Mandatory policies to cap and trade greenhouse gas emissions as a cost-effective means of combating climate change will create such a market, but it is essential that the policies recognize credible carbon management and reduction practices such as the production and utilization of biochar as eligible for offset credits. Biochar's eligibility as an offset in a cap-and-trade program can provide necessary market signals and economic incentives for farmers and private investors to provide the necessary start-up capital for biochar projects.

American farmers feed the world, serve as stewards of our nation's natural resources, and are the backbone of our economy. They, too, are impacted in these tough economic times, struggling to

[8] Lehmann, J., (2009)"Biochar Systems," *Biochar for Environmental Management*, pp. 156-57. (These savings are calculated with April 2008 prices of $2.2 per gallon)
[9] Collison, M., Collison, L., Sakrabani, R., Tofield, B., Wallage, Z. (2009) Biochar and Carbon Sequestration: A Regional Perspective, p. 34.
[10] Ibid, at p. 68.

deal with high energy and fertilizer costs. Yet, with the right policy signals, our nation's agricultural and forest producers can help us to meet the challenges posed by climate change. To allow them to do this, the Senate must recognize the value of high-impact, cost-effective agricultural and forestry offsets, including biochar production and utilization systems, which can provide meaningful opportunities for significant GHG mitigation and income generation for the agricultural and forestry sectors.

We look forward to working with you to harness the potential GHG emission reductions and ancillary soil improvements to be gained from biochar production and utilization systems as part of an agricultural and forestry offset program.

Sincerely,

Debbie Reed
Executive Director
International Biochar Initiative

cc: The Honorable Debbie Stabenow

JOHN DEERE

John Deere Public Affairs Worldwide
801 17th Street, NW
Washington, DC 20006
Phone: 202.423.2284 Fax: 202.296.0011
Stiffler-ClausVanessaG@JohnDeere.com

Vanessa Stiffler-Claus
Manager, Federal Affairs

July 22, 2009

The Honorable Tom Harkin
Chairman
Committee on Agriculture,
Nutrition and Forestry
United States Senate
Washington, DC 20510

The Honorable Saxby Chambliss
Ranking Member
Committee on Agriculture,
Nutrition and Forestry
United States Senate
Washington, DC 20510

Dear Chairman Harkin, Ranking Member Chambliss:

As the Senate Agriculture Committee begins discussion of the role of agriculture and forestry in global warming policy, it is critical to assess both the risks and opportunities to the agriculture, forestry, and land use sectors from climate change. In addition, policies to address climate change must recognize both past and future innovations that will increase agricultural and forestry productivity and can provide numerous additional environmental benefits.

Background

For 172 years, Deere & Company (John Deere) has enabled human flourishing by offering product and service solutions to those who produce our food, fiber and fuel, build our homes and infrastructure, and beautify and protect our environment. John Deere has invented, manufactured, and sold worldwide thousands of models of innovative agricultural, construction, forestry, lawn and turf care, and landscaping equipment, and the engines powering them. All of these tools were designed with a unifying purpose – improving productivity and efficiency for our customers. From John Deere's early endorsement of soil conservation in the 1930s, to development of advanced water conservation technologies today, John Deere has strived to help customers become more efficient while reducing their impact on the environment.

John Deere also creates environmentally beneficial opportunities for its customers in rural areas by investing in wind energy and biomass technologies that clean the air, reduce greenhouse gas (GHG) emissions, and help sustain their communities.

The company also rigorously applies environmental stewardship to its own operations. From early adoption of a strenuous corporate environmental policy in the 1960s, through continued efforts today in energy efficiency, water and air quality, and occupational health and safety, the company has remained committed to environmental protection and enhancement. This is reflected in John Deere's participation in the EPA Climate Leaders program, with a commitment to reduce greenhouse gas (GHG) emissions globally by 25% as measured by revenue by 2014.

The challenge of climate change and global GHG emissions presents the need for new policies crafted specifically to avoid the consequences of climate change such as reduced

water availability and regional changes in agricultural and forestry productivity and impacts on parks and greenspace. John Deere believes addressing these risks require leadership in and by the United States. As such, John Deere joined dozens of businesses and environmental groups in the U.S. Climate Action Partnership (USCAP) that support a mandatory, economy-wide system based on cap and trade to address United States GHG emissions. Properly-crafted, market-based programs for environmental priorities have worked in the past and can provide a cost-effective, environmentally-sustainable framework for addressing GHG emissions. A national program can also harmonize state and local efforts to reduce GHG emissions, and coordinate with similar programs already in place or under consideration globally. Utilizing existing laws such as the Clean Air Act to address GHG emissions is inefficient and could result in burdensome regulation for small businesses, including agriculture and forestry producers, and would fail to encourage innovation to reduce emissions in these sectors and in turf and landscaping.

Properly-crafted climate change and energy policies also can result in opportunities for the agriculture, forestry, and land use sectors to participate in emissions markets and to generate renewable energy and fuels to meet the demands of a low-carbon future. Consistent with our assertion that environmental policies must deliver economic and environmental results, John Deere will continue to engage with policy-makers and other stakeholders to craft policies that encourage environmental stewardship while ensuring robust economic health of rural communities and the agriculture and forestry sectors. John Deere will also continue to respond to customer needs with innovative technologies and products that promote a highly productive agriculture and forestry sector while conserving resources.

Agriculture and forestry producers are justly concerned that new climate policies will result in increased costs of inputs, particularly fuel and fertilizer, which will erode their competitiveness in the global marketplace. As policymakers craft legislation to address climate change, a variety of tools can help mitigate these concerns. A properly-crafted cap and trade system is a key method of containing costs, as it facilitates emissions reductions at the least cost, while rewarding agriculture and forestry producers for their actions. Achieving cost-effective reductions is critical to ensuring a smooth transition for those sectors of the economy that are significant users of energy and fossil fuels. In addition to the market-based flexibility that a cap and trade framework can provide, it can also allow a comprehensive allowance allocation program. This can further mitigate costs in fuels and fertilizer costs and thus maintain productive and efficient agriculture and forestry sectors.

Rising greenhouse gas emissions and the attendant climate change can result in reduced water resources, increased temperature variability, changes in plant growth patterns, all combining to produce regional changes in productivity. However, John Deere believes that the negative consequences can – indeed must – be met by a global focus on innovation and expanded utilization of new technologies to provide the food, feed, fiber, and energy a growing and increasing affluent population demands. These solutions must also reward agriculture and forestry producers for their actions that reduce GHG emissions, preserve soil quality, reduce of water impacts, and maintain wildlife habitat.

As discussed above, John Deere suggests that a cap and trade program is an economically and environmentally effective method of reducing GHG emissions in the United States.

Under a national climate program, however, some sectors are not appropriately included for direct regulation with agriculture and forestry being prime examples. These sectors, with millions of producers, are relatively minor contributors to U.S. GHG emissions. However, these producers are critical to reducing emissions, as the agriculture and forestry sectors can sequester up to 20% of total emissions, and can provide the most effective method of cost containment through production of emissions offsets. Therefore, policy frameworks to address GHG emissions must recognize and incentivize a wide variety of agriculture and forestry activities as offsets and not seek to directly regulate agriculture and forestry.

The agriculture and forestry sectors -- just as other economic sectors -- continually innovate with new products and services to meet customer demands and increase productivity John Deere has developed numerous products to help producers save fuel, fertilizer and pesticide inputs, water, and time – all of which both save producers money while providing significant environmental benefits.

Reduced Fuel Consumption and Increased Equipment Efficiency Saves Money and Reduces GHG Emissions

Fuel efficiency always has been a significant driver for John Deere's customers. At the same time, new advances have been significantly increasing crop yields, in turn driving technology developments towards larger, higher capacity, and more energy efficient combines. In 1970, some 500,000 combines were required to harvest U.S. grain crops. By 2007, that number had fallen to only 165,000, even though the average corn combine harvested approximately seven times that of its predecessor in 1970. Taken together, these productivity improvements reduced the average energy required to harvest one ton of grain by as much as one half. This means an approximate doubling of combine efficiency in terms of GHG emissions per ton of grain harvested.

Tractors have also dramatically increased in fuel efficiency and capacity – the John Deere 8430 set the record as the most fuel-efficient row-crop tractor ever tested at the Nebraska Tractor Test Lab. It is 23% more efficient than the previous model it replaced, saving 3 gallons of fuel per hour – resulting in thousands of dollars in annual fuel savings, and the ability to cover the same amount of acres with much less fuel, again meaning GHG emissions. Similar fuel savings and GHG reductions can be extended to self-propelled equipment used throughout agriculture.

Similarly, economic challenges experienced by the forestry industry have made reducing fuel costs particularly critical. John Deere's 748H Grapple Skidder – appropriately nicknamed the "Miser" – consumes 14% less fuel per hour than comparable machines. At the same time, it hauls 28% more tons per hour – making it nearly 50% more energy-efficient in terms of tons of wood hauled per gallon of fuel consumed.

Beyond improving current equipment, significant GHG reductions may be achieved by creating entirely new equipment or systems. One particularly useful example is John Deere's 7760 Cotton Picker. In standard cotton-harvesting operations, five pieces of equipment are required – each modern cotton picker requires the support of a boll buggy, a boll buggy tractor, a module builder, and module builder tractor. The 7760 Cotton Picker greatly simplifies this harvesting model by incorporating a high-volume cotton accumulator,

a module builder, and module handler in a single machine. With this new technology, the number of pieces of support equipment is reduced significantly, thereby reducing GHG emissions.

New equipment systems have the potential to significantly reduce the number of jobsite machines needed in the forestry sector as well. For example, John Deere's "cut-to-length" forestry system can reduce a typical logging jobsite machine count from five machines in a "full-tree" logging operation to four. Typical full-tree operations include a feller-buncher to fell the tree, two skidders to drag the trees to the processing site, and two knuckle-boom loaders to pick the trees off the ground, de-limb and load them onto trucks for hauling to the mill. A cut-to-length operation with similar productivity includes two wheeled harvesters that fell, de-limb, and cut the trees to the selected log length, and two wheeled forwarders that pick the logs off the ground, stack, and haul away. The forwarder can haul more wood per trip than the skidder, without the resistance caused by dragging limbed trees through the woods. As a result of reduced machine count and more efficient hauling, jobsite fuel consumption can be 15% less than full-tree operations with comparable productivity. The fuel savings combined with reduced soil disturbance reduce GHG emissions.

These product innovations are not limited to agriculture and forestry use in rural regions, but will also reach into urban areas through increased efficiency in products for turf and lawn care, park maintenance and restoration, and activities to create greenspace in urban and suburban areas. For example, as one of several John Deere hybrid mowers offered for golf course management, the John Deere 2500E Hybrid Riding Greens Mower (the first hybrid greens mower in the industry) uses an electric reel motors in place of hydraulics to power the mowing reels. This lowers noise and provides up to 30% better fuel economy than a comparable hydraulic-powered model while operating at lower engine RPMs.

Equipment manufacturers are also continually researching and developing additional methods of understanding the demands placed on equipment, its use, and efficiency. With John Deere's Machine Knowledge Center, it will be possible to analyze fuel consumption of multiple pieces of equipment, identifying and monitoring efficient behaviors and machine settings, which can be communicated to other equipment operators – further conserving fuel and ensuring emissions reductions.

Improved Inputs Management Saves Money and Reduces Emissions

In addition to fuel savings which reduce emissions, agriculture and forestry producers can utilize various innovations in equipment and services that can significantly increase the efficient use of fertilizer and other inputs. More efficient use decreases nitrous oxides (N2O) emissions. For example, the John Deere 2510H Nutrient Applicator delivers fertilizer with very minor soil disturbance at shallow depths and increased speeds. This requires less energy and reduces GHG emissions compared to traditional placement of nutrients. The capability to apply nutrients closer to the time of plant uptake results in higher Nutrient Use Efficiency and further reduces GHG emissions.

Agriculture and forestry equipment can also realize improved GHG emission reductions and efficiency of input utilization and operation through software platforms that enable precision

planting, fertilization and pest management to supply the optimum level of inputs needed for the specific soil, crop, geography and season. Also, precision systems such as the John Deere StarFire™ and AutoTrac™ systems can deliver accuracy to within one inch for agricultural production – applying seed, fertilizer, and pesticides with minimal overlap, automatically controlling input application along the width of the equipment, reducing fuel consumption and documenting products applied.

The benefits of reduced GHG emissions are not just realized with large advanced equipment, but can also be realized through practices including adaptation of precision irrigation. Efficient irrigation, such as John Deere's water technologies for drip and micro irrigation can help increase yields by improving quantity, quality and uniformity of crops which can increase producer income. These technologies enable a reduction in water needed thus reducing GHG emissions from pumping water as well as decreasing runoff and evaporation. Further, crop inputs can be applied via the irrigation system, enabling deliver of the input to the plant at the time and place needed for most efficient growth while also reducing GHG emissions.

Climate Change Policy Must Recognize Agriculture & Forestry Efforts to Reduce Emissions and Sequester GHG

In addition to recognizing that agriculture and forestry producers will continue to demand and adopt more efficient methods, practices, and equipment to maximize crop returns from input use, it is critical that policy makers craft a program for these producers to participate in a market-based solution to address climate change. Emissions offsets from the agriculture and forestry sectors can result from emissions reductions from activities such as manure management and nutrient management, as well as from sequestration of GHG through practices related to tillage and cropping practices and forestry activities. These practices can be facilitated by much of the same technologies and services discussed above.

The very same agriculture and forestry equipment that enables precision farming and forestry practices can be used to verify information needed to estimate GHG savings. Sensing equipment in planters, field documentation devices in agricultural equipment, and yield monitors in harvesters can monitor the practices employed, the inputs applied, and the crop removal in a way that will help facilitate and verify grower participation in GHG offset projects. This verification capability will help ensure the quality of offset projects.

In the forestry sector as well, equipment harvesting head automation could be combined with species selection information that can monitor the volume of carbon removed from a site during harvest. Additionally, end use of the harvested timber (such as for dimensional lumber or pulp wood) can be determined at time of harvest to enable effective accounting of the GHG sequestration provided by the forestry resource.

Comprehensive Energy Policies Can Create Additional Opportunities

Policies crafted to address climate change are closely related to policies that can increase renewable energy production and development of renewable fuels, while also incentivizing land practices that save energy. These programs can help reduce GHG emissions, create new and additional opportunities for the agriculture and forestry sectors, and increase greenspace in urban and suburban areas.

As a developer of wind energy projects, with 31 projects and 676 MW in place already across seven states, John Deere understands that additional deployment of renewable energy, such as wind, will result in economic opportunities for many parts of the county, particularly in rural and agricultural areas. Harvesting the wind – a new cash crop – through development of commercial-scale wind energy projects provides a long-term steady income stream for landowners. These projects can create jobs and grow the tax base and create revenue sources that benefit the entire community.

One recent example is *Michigan Wind 1*, located near Ubly in the "Thumb" area of Michigan, some 90 miles north of Detroit. This project consists of 46 GE 1.5MW wind turbines producing 69 MW of wind energy – enough to power approximately 20,000 homes. The project is located across 6,400 acres of agricultural land owned by 96 different farmers and local residents. Over the life of the project, the community will receive over $10 million in additional local tax revenues and more than $13 million in land rents. This project alone will avoid over 131,000 tons of CO2 emissions annually, and is indicative of John Deere's efforts to help sustain rural communities through renewable energy production.

The nation's forestry sector will also see increased opportunities for generating renewable energy from forestry biomass under properly-crafted energy and climate policies. For example, forestry biomass can be bundled to create energy from the woods – turning a former waste product into a valuable commodity. The John Deere 1490 Eco-III Energy Harvester collects, compacts, and wraps slash, trimmings, and waste wood into bundles that can be easily transported. This energy-wood harvesting technology is highly efficient, with productivity of up to 40 bundles an hour, with minimal ground compaction and fossil fuel use.

The opportunities in comprehensive energy and climate policy can also benefit urban and suburban communities. Creating and enhancing greenspace and parks serves to reduce water runoff, create habitat and recreational space, while reducing the heat island effects of hardscape surfaces and create a broader potential opportunity for carbon sequestration, among other benefits. Policies can also incentivize urban tree-planting and landscaping to dampen demand on electricity generation – saving consumers energy and money while improving their local environment. John Deere Landscapes provides numerous solutions for communities across the country to realize these environmental, economic, social and other benefits and is focused on enhancing the many benefits of properly managed turf and landscapes with innovative and comprehensive solutions for residential, commercial, golf, and other applications. A significant focus is on products and services to aid efficient resource use and improve customer knowledge around best management practices (BMPs) and sustainable management practices. Encouraging and implementing new technologies and improved BMPs can support more efficient rooftop gardens, healthy turfgrass and disease and drought resistant landscapes, resulting in cooler urban areas that sequester more GHG. Adopting efficient irrigation technologies, water detention systems (such as rain gardens and permeable pavement) and water retention systems (such as cisterns and rain barrels) can dramatically reduce the consumption of water. These practices can also significantly reduce storm water runoff and the silt and particulates associated with it, helping improve water quality.

In summary, John Deere believes that the agriculture and forestry sectors and urban and suburban parks and landscapes can provide significant opportunities for reducing GHG emissions, increasing energy independence, and expanding renewable energy production,

while generating water and local environmental benefits. Ongoing innovation and expected advances in technologies will enable these sectors to meet the essential needs of a larger and more affluent population for food, clothing, housing, and energy while at the same time enhancing the environment and improving communities across the United States and globally. We look forward to working with you and your staffs as you address the global climate change and craft legislative policies.

Sincerely,

NAFO | National Alliance of Forest Owners
Investing in the Future of America's Forests

2025 M Street, NW
Suite 800
Washington, DC 20036

p: 202.367.1163
f: 202.367.2163
www.nafoalliance.org

Statement of the National Alliance of Forest Owners
Senate Committee on Agriculture, Nutrition and Forestry
Hearing entitled, "The Role of Agriculture and Forestry in Global Warming Legislation."
July 22, 2009

I. Introduction

The National Alliance of Forest Owners (NAFO) is pleased to submit comments to the Senate Committee on Agriculture, Nutrition and as it considers climate change and energy legislation. NAFO is an organization of private forest owners committed to promoting Federal policies that protect the economic and environmental values of privately-owned forests at the national level. NAFO membership encompasses 75 million acres of private forestland in 47 states. NAFO members are well positioned to help our nation in the development of approaches that utilize private working forests, and the products they produce, as a critical tool in fashioning solutions to climate change and energy independence.

To provide some context, forests in the United States, nearly 60 percent of which are privately owned, sequester almost 200 million metric tons of carbon (CO_2) each year,[1] offsetting about 10 percent of annual U.S. emissions from burning fossil fuels.[2] According to the Environmental Protection Agency (EPA), this amount represents 84 percent of the carbon sequestered by all land uses.[3] An appropriately crafted offset system that accounts for the sequestration and storage capabilities of responsibly managed working forests and harvested wood products in an industrial emissions offset

[1] US Environmental Protection Agency. 2007. *Inventory of U.S. greenhouse gas emissions and sinks: 1990-2005.* EPA 430-R-07-002.

[2] Birdsey, R., K. Pregitzer, and A. Lucier. 2006. Forest carbon management in the United States: 1600-2100. J. Environmental Quality 35: 1461-1469.

[3] US Environmental Protection Agency. 2007. *Inventory of U.S. greenhouse gas emissions and sinks: 1990-2005.* EPA 430-R-07-002.

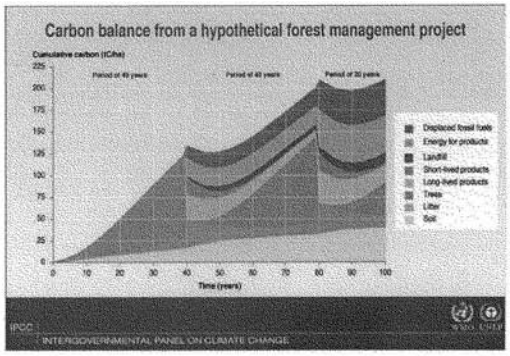
marketplace can play a significant role in helping the nation address greenhouse gas (GHG) emissions, and do so in a way that reduces the overall cost of achieving mandatory emissions reduction targets. The essential elements of a national climate change and energy policy that appropriately incorporate the contributions of working forests are outlined in Section VI below.

I. Responsibly managed private forests play a key role in sequestering carbon.

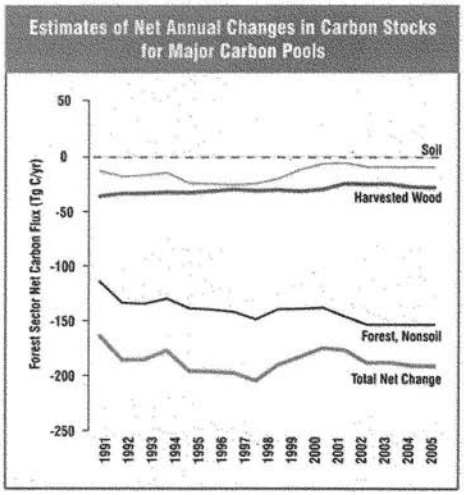
The basic proposition that responsibly managed forests play a critical role in sequestering carbon is beyond dispute. The EPA, in considering approaches to address climate change, has recognized that responsibly managed forests are considered one of five key "groups of strategies that could substantially reduce emissions between now and 2030."[4] Similarly, the Intergovernmental Panel on Climate Change (IPCC) report on mitigation technologies highlights forest management as a primary tool to reduce GHG emissions.[5] Indeed, the IPCC contends that, "[i]n the long term, a sustainable forest management strategy aimed at maintaining or increasing forest stocks, while producing an annual sustained yield of timber, fibre or energy from the forest, will generate the greatest mitigation benefit."[6] The following graphic illustrates this work (the "IPCC Managed Forest Graph"):[7]

(see chart on next page)

[4] Regulating Greenhouse Gas Emissions Under the CAA, 73 Fed. Reg. 44,354, 44,405 (July 30, 2008).
[5] Id. at 44,405-06.
[6] Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [B. Metz, O.R. Davidson, P.R. Bosch, R. Dave, L.A. Meyer (eds)], Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, page 543.
[7] Climate Change 2001: Mitigation. Contribution of Working Group III to the Third Assessment Report of the Intergovernmental Panel on Climate Change, Technical Summary, Section 4.1, Figure TS-6 (2001).



Private forests in the United States are already a valuable and multifaceted tool in the effort to reduce U.S. greenhouse gas emissions and remove carbon dioxide from the atmosphere. As the following EPA chart demonstrates, managed forests and harvested wood products in the United States provide a significant carbon sink:



EPA Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2006.[8]

[8] Available at USEPA #430-R-08-005, http://www/epa.gov/climatechange/emissions/usgginventory.html.

As EPA has explained, "[o]verall, forestry, land use and land-use change activities are considered 'sinks,' absorbing carbon dioxide from the atmosphere through a process known as carbon sequestration. In 2006 these activities resulted in removing 883.7 MMTCO$_2$e (240.8 MMT Carbon) from the atmosphere."[9] Despite these impressive figures, as described below there are significant further opportunities for forests to contribute to an offset system through the sequestration and storage of greater amounts of carbon.

II. A successful market based mechanism for controlling GHGs must consider the opportunities provided by responsibly managed forests.

A climate change program focused on reducing GHG emissions through market mechanisms that generate credits should include offsets from responsibly managed domestic forests and harvested wood products.

Private forests long have been recognized as a source of real, verifiable reductions in GHGs. Most established GHG trading regimes credit forestry activities. For example, trading platforms and registries that recognize forest management include the Chicago Climate Exchange ("CCX") and the Voluntary Carbon Standard ("VCS"). The Regional Greenhouse Gas Initiative ("RGGI") and the Western Climate Initiative ("WCI") both intend to consider forest management offsets in the very near future.[10] NAFO is cautiously encouraged that the California Air Resources Board has initiated work by the Climate Action Reserve (CAR) to revise its forest project protocol to encourage greater participation by managed forest owners. NAFO is also participating with a broad array of U.S. and Canadian stakeholders to develop an international forest project standard for measuring carbon from forest projects that will be compliant with

---

[9] EPA Technical Support Document for Stationary Sources at 39 (June 2008).

[10] In contrast, the United Nation's Clean Development Mechanism ("CDM"), does not allow credits for forest management but limits credits to afforestation or reforestation. This approach has produced very few projects in the forestry area due to unnecessary restrictions in the program. By comparison, the Voluntary Carbon Standard, a global consortium dedicated to improving standards and programs for offsets, has proposed potential standards for forestry management.

the requirements of the American National Standards Institute (ANSI) and its Canadian counterpart.

Given the scope of emissions reductions that can result from improved forest management both domestically and in developing countries, it is important that managed forests and harvested wood products play a role in future national and international offset programs. Generating credits from responsibly managed forests and harvested wood products, and allowing the trading of such credits, affords both regulators and industry significantly greater flexibility in determining how to achieve overall net GHG reductions.

For example, while it may not be economically or technologically feasible for a utility to reduce its GHG emissions for several years, acquiring forest offset credits could have the dual benefit of helping the utility achieve compliance in an economically efficient way until it can enact its own GHG controls while also encouraging strong long-term forest management practices that lead to further GHG reductions in the future. In this way, forests provide an extraordinary opportunity to create a multi-faceted national program that promotes both immediate and sustainable long-term GHG reductions.

Importantly, under appropriately constructed policy, the forest sector could be in a position to immediately participate in an offset program, thus helping ensure the successful start-up of a market oriented mechanism. Promoting policies that encourage emitters to work voluntarily with the private forest sector to offset their GHG emissions will enable the nation to attain emission goals in a cost-effective manner and at the earliest opportunity.

NAFO recognizes that no protocol or registry is perfect. However, that should not distract from the role that responsible forest management and harvested wood products can play in reducing GHG levels and the greater flexibility they offer to achieve net GHG reductions in a cost-effective manner. Policies should seek to encourage and credit such benefits when seeking to achieve GHG reductions economy wide.

III. A broad range of forest management activities are available for inclusion in an offset system.

Managed forests in the United States present a clear opportunity to reduce atmospheric CO_2 and mitigate GHG emissions. Available forest management activities that can aid in reducing greenhouse gas emissions include afforestation, reforestation, conservation and the production of harvested wood products. Research on private forestlands has shown that more intensively managed forests and the products they produce can sequester and store as much as 150 percent more tons of carbon per acre than less intensively managed forests.[11]

Products like building materials, furniture and other consumer goods made of wood harvested from working forests also are an important means of storing carbon over long periods. The EPA estimates that the amount of carbon stored annually in forest products in the United States is equivalent to removing more than 100 million tons of CO_2 from the atmosphere every year.[12] Independent studies show that wood products used in building construction store more carbon and use less fossil fuels than other materials, such as steel and concrete. Wood framing in a home, for example, produces 26 percent less net CO_2 emissions than steel and 31 percent less than concrete.[13]

IV. A sound offset system that promotes forest markets will enhance the carbon benefits of private forests over time.

NAFO's members represent more than 75 million acres of private forest lands covering every region of the country. These forests are managed according to state-

---

[11] *Carbon Sequestration in Californian Forests; Two Case Studies in Managed Watersheds* by Dr. Cajun James, Dr. Bruce Krumland, and Dr. Penelope Jennings Eckert, December 12, 2007. http://www.spi-ind.com/html/forests_research.cfm.

[12] US Environmental Protection Agency. 2007. *Inventory of U.S. greenhouse gas emissions and sinks: 1990-2005.* EPA 430-R-07-002.

[13] Perez-Garcia et al. *The environmental performance of renewable building materials in the context of residential construction.* Wood and Fiber Science CORRIM Special Issue 37:3-17.

based water quality best management practices, state forestry regulations and standards, third party certification programs and contracts and agreements that ensure long-term forest renewal and strong environmental protection. At the same time, forest owners depend on economically viable markets for products and services to continue making investments in good stewardship and to maintain working forests on the landscape over the long term.

An offset policy that supports existing markets and promotes new and emerging markets for forest carbon will help maintain and strengthen the forest land base over time, thereby continuing its contributions toward reducing nationwide GHG levels. This includes the development of new sources of domestic renewable energy, such as electricity from forest biomass and cellulosic biofuels that take advantage of the carbon mitigation benefits of forests to help maintain a low carbon economy.

V. Forest biomass is a renewable energy that is an important part of the climate change solution. An inclusive definition of renewable forest biomass is essential to realizing the benefits private forests can provide.

Wood is a dependable and plentiful domestic renewable energy resource that can be utilized for energy production through a variety of processes like biomass generation, wood gasification and conversion to cellulosic biofuels. Wood, wood residuals and other plant material can be utilized to produce steam and heat hot water boilers. Steam can be converted to electrical power by turbines or used to heat buildings through piping distribution networks. Newer "wood gasification" technologies heat wood in an oxygen-starved environment, collect gases from the wood and later mix the gases with air or pure oxygen for combustion. Wood gases can be cooled, filtered and purified to remove pollutants and used as fuel for internal combustion engines, micro-turbines and gas turbines.

The use of wood from responsibly managed forests for electrical and thermal energy production is carbon neutral. The EPA has concluded that there is "'scientific consensus'... that the carbon dioxide emitted from burning biomass will not increase CO2 in the air if it is done on a sustainable basis."[14] This position is supported not only by the IPCC, but also by the Energy Information Administration (EIA), the World Resources Institute (WRI) and other credible scientific bodies.

Wood used to produce transportation fuels also has a very favorable carbon footprint. The EPA has determined that for every BTU of gasoline replaced by cellulosic ethanol, the total lifecycle GHG emissions that would have been produced from that BTU of gasoline would be reduced by 92.7 percent[15].

In order for forest biomass to make its full contribution to producing low carbon energy, definitions of qualifying renewable energy feedstocks should provide a level playing field for market access across all feedstock sources, including wood, and encompass the full range of forest biomass, including trees and other plants, forest residuals (e.g., tops, branches, bark, etc) and byproducts of manufacturing (e.g., sawdust, bark, chips, dissolved wood retrieved from the paper-making process, etc). Presently there are at least four different definitions of qualifying forest biomass in federal statute[16]. This adds complexity and confusion to project developers, biomass producers and federal program administrators who are required to determine how the various, and at times conflicting, definitions interact with one another.

Appropriately including forest biomass in a renewable electricity standard would take full advantage of its carbon mitigation benefits in the energy context. Likewise, a policy that discourages forest biomass utilization will forfeit such benefits, particularly in

---

[14] U. S. Environmental Protection Agency Combined Heat and Power Partnership. *Biomass Combined Heat and Power Catalog of Technologies*, 96 (Sept. 2007) available at www.epa.gov/chp/documents/biomass_chp_catalog.pdf.

[15] U.S. Environmental Protection Agency. April 2007. *Regulatory Impact Analysis for the Renewable Fuels Standard Program*. EPA 420-R-07-004.

[16] Separate definitions of eligible forest biomass can be found in Section 45 (c)(3) of the Internal Revenue Code (26 U.S.C. 45(c)(3)); Section 203(b)(1) of the Energy Policy Act of 2005 (42 U.S.C. 15852(b)); Section 201(1)(I) of the Energy Independence and Security Act of 2007 (42 U.S.C. 7545(o)(1)(I)); and Section 9001(13) of the Food, Conservation, and Energy Act of 2008 (7 U.S.C. 8101 (12)).

areas where fossil fuels are the predominant source of energy production and where alternative forms of renewable energy, such as wind, solar and geothermal are not viable options.

VI. NAFO has several suggestions for inclusion in any national climate change and energy policy.

Based on our experience in forest management and the forest products sector, the following should be included in any national climate change policy:

- **The U.S. Department of Agriculture should serve the key role with respect to agricultural and forestry offset projects.** The USDA has critical expertise to bring to the development of methodologies and processes for crediting offset projects in the agriculture and forestry sectors. Indeed, Congress already recognized such a role for the USDA in last year's Farm Bill. Like Section 2709 of the Food, Conservation, and Energy Act of 2008, climate change legislation should place primary responsibility on USDA to establish technical guidelines and regulations to assess offsets from forest projects, including approving eligible project types, establishing project protocols and certifying specific projects.

- **Climate change legislation must identify eligible offset projects at the outset.** The initial years of a cap and trade system will be critical to the long term success, and a vigorous and vibrant source of offsets is necessary to implementation during these critical early years. These include forest management activities that increase carbon stocks, harvested wood products, afforestation and reforestation and avoided deforestation. Any offsets program should be open, inclusive and establish a level playing field for all project types.

- **Offset provisions should ensure early offset availability.** To ensure that offsets are available during the outset of the cap-and-trade program, any climate legislation must give offset project developers as much early guidance and certainty as

possible so they can attract investment and develop projects in time for the first compliance periods. Congress should direct relevant agencies to begin developing regulatory frameworks immediately, should significantly shorten the deadlines for action for developing such regulations and should streamline various other procedures to make offsets available as soon after enactment as possible. Legislation also should fully encompass offsets generated by well established programs.

- **The definition for renewable forest biomass should be broad and inclusive.** The most effective definition for eligible renewable forest biomass was enacted by Congress in the 2008 Farm Bill. The House captured this definition well in H.R. 2454, and the Senate should adopt the same definition.

VI. Conclusion

NAFO appreciates this opportunity to provide input on the important opportunities private working forests provide to reduce atmospheric concentrations of GHGs. Working forests work to sequester carbon and are undisputed in serving as a critical carbon sink. In order to be effective, any market based mechanisms for controlling GHGs must incorporate working forests and the broad array of management activities associated with them. This will enhance the carbon benefits provided by working forests and better enable our nation to achieve its overall climate change objectives.

NAFO looks forward to further discussions with this Committee and other policy makers in the Senate as work progresses on comprehensive climate change legislation.

NATIONAL CATTLEMEN'S BEEF ASSOCIATION
1301 Pennsylvania Ave., NW, Suite #300 • Washington, DC 20004 • 202-347-0228 • Fax 202-638-0607

Statement for the Record

Senate Committee on Agriculture
Hearing on the Role of Agriculture in Global Warming Legislation
July 22, 2009

The National Cattlemen's Beef Association ("NCBA") is the national trade association representing U.S. cattle producers with nearly 32,000 individual members and sixty-four state affiliate, breed and industry organization members. Together NCBA represents more than 230,000 cattle breeders, producers and feeders, and is the marketing organization for the largest segment of the nation's food and fiber industry.

NCBA members are responsible environmental stewards who respect and care for the land, air, water, and animals that are fundamental to sustaining our way of life. We recognize an environmental stewardship code and have adopted policy that states that the Association "shall not be compelled to defend anyone in the beef cattle industry who has clearly acted to abuse grazing, water, or air resources." 2005 Policy, National Cattlemen's Beef Association, Property Rights and Environmental Management Policy 1.1. In addition, we comply with stringent regulations under the Clean Water Act, Clean Air Act, Emergency Planning and Community Right-to-Know Act, and others designed to ensure environmental protection. Cattle producers will continue to work every day to protect and improve the environment so that they and future generations will be able to continue to live off the land.

The Agriculture Sector of the Economy is a Minor Source of Greenhouse Gas Emissions and Should Be Exempt From Regulation. The agriculture community has been told, and press accounts have repeated, that agriculture would not be regulated under a cap and trade bill. While the House bill appropriately exempts agriculture from regulation under the cap, it includes a provision that would require uncapped emitters of methane to comply with performance standards established by the EPA. Agriculture producers were told by Energy and Commerce Committee staff that agriculture would not be included under this provision, but unfortunately no explicit exclusionary language was included in the bill. The Senate must clarify and include specific statutory language excluding agriculture from these requirements.

Exemptions for agriculture makes sense for a number of reasons including the fact that agriculture is a minor source of greenhouse gas emissions. According to the U.S. Environmental Protection Agency, in 2007 the entire agriculture industry emitted only 5.77% of all greenhouse gas (GHG) emissions in the United States, and manure management activities from all livestock operations represent less than one percent (specifically .82%) of all U.S. GHG emissions. Compare these emissions with emissions from fuel combustion which accounted for 94% of all CO2 emissions in the same year.

In the agriculture sector, enteric fermentation is the largest source of methane emissions in the U.S., followed by manure management in anaerobic digesters. In 2007, methane emissions from enteric fermentation were only 2.3 percent of total US GHGs and methane from manure was only .7 percent. The largest factors affecting methane emissions from ruminant animals are the type of diet and digestive efficiency of the animals. Studies show that a grain based diet produces less methane than a forage-based diet. According to a 2006 Pew Center on Climate Change report entitled "Agriculture's Role in Greenhouse Gas Mitigation, "for most confined livestock, feed quality and digestibility are already at a relatively high level, and further improvements from conventional changes in feed rations are likely to be modest."

Nitrous oxide is produced by biological processes that occur in soil, water, fertilization, land application of livestock manure, retention of crop residues, irrigation, tillage practices, etc. According to the EPA, nitrous oxide emissions from agriculture soil management on croplands and grasslands accounted for 3.4 percent of total GHG emissions in the U.S. in 2007. Nitrous oxide emissions that resulted from manure management accounted for only .2 percent. According to the Pew Center's report cited above, "opportunities for mitigating N2O emissions from stockpiled or composted manure are relatively limited.

In addition, the EPA has identified GHG benefits associated with the use of manure as agricultural nutrients. In 2008, The EPA released the "National Water Program Strategy: Response to Climate Change." In Chapter III, entitled National Water Program: Climate Change Response Actions, EPA describes the contribution agriculture makes to nitrous oxide emissions and states "Agriculture producers have the potential to reduce nitrous oxide releases by expanding the use of manure, biosolids or other organic residuals." The availability of manure is only possible because of the existence of animal feeding operations which generate manure.

Similarly, according to the U.S. EPA's annual "Emissions and Sinks" report, in 2006, land use, land use change, and forestry activities resulted in the significant benefit of a net carbon sequestration offset of approximately 14.8% of total U.S. CO2 emissions, or 12.5% of total US GHG emissions. The EPA attributes mineral soil carbon sequestration "to the conversion of cropland to permanent pastures and hay production, a reduction in summer fallow areas in semi-arid areas, an increase in the adoption of conservation tillage practices, and an increase in the amount of organic fertilizers (i.e. manure and sewage sludge) applied to agricultural lands. Again, the application of manure as an organic fertilizer is only possible because of the existence of animal feeding operations which generate manure.

The Process Must be Slowed Down so that the Bill's Effects on the Price of Energy and other Costs of doing Business can be Fully Studied and Understood. NCBA is very concerned about the fact that very few economic analyses have been performed on the House climate bill; and that there will not be adequate time to perform independent and unbiased economic analysis of the Senate bill prior to EPW Committee consideration. NCBA believes it is critical that there be adequate time to sift through the

likely voluminous bill and understand all the effects it could have on the economy as a whole, and the cattle industry in particular. When Congress considers a bill of this magnitude and economic import, we believe careful analysis and deliberation are essential. Our members are very concerned, for example, about the effects H.R. 2454 could have on the costs of fuel, electricity, feed, fertilizer, equipment, and other inputs necessary to maintain a cattle operation. Some economists have estimated that H.R. 2454 would cause farm income to drop anywhere from $6 billion in the short term to $50 billion long term. The cattle industry has suffered significant economic setbacks lately and, if these estimates are anywhere close to being accurate, this bill would very likely push many operations over the edge.

Offsets Provisions Must be Strong. The agriculture sector has been told all along that agriculture's ability to generate offsets to sell to the regulated industries will help all sectors of the economy mitigate increased costs associated with the bill. The House bill should be a starting point from which the Senate will expand and improve agriculture's participation and opportunities to generate and sell offsets.

The agriculture sector drafted key principles that we believe are important in any cap and trade bill. Those principles include:

- The agriculture sector must not be subject to an emission cap
- Any cap and trade program must fully recognize the wide range of carbon mitigation or sequestration benefits that agriculture can provide
- Any cap and trade legislation must make economic sense for agriculture
- The USDA should promulgate the rules and administer an agricultural offset program
- The use of domestic offsets must not be artificially limited
- Establish carbon sequestration and greenhouse gas mitigation rates based on science
- Any cap and trade program must provide an initial list of project types that are eligible agricultural offsets
- Early actors must be recognized so that producers who have done good things in the past for the environment will not be penalized by not being able to participate in offset creation

Unfortunately, it is NCBA's understanding that the Senate EPW Committee is considering stripping its bill of the House Agriculture Committee's amendments and starting over. NCBA is strongly opposed to this action. Without the House language in the bill, farmers and ranchers are very skeptical about the prospect of being able to

participate in these markets. The House agriculture provisions should be a floor for agriculture's participation, not a ceiling. It is our hope that the Senate will expand and improve on what the House did for agriculture, not undo what they did.

It is for these reasons that NCBA remains concerned about cap and trade legislation, and is hopeful that they will be addressed in the Senate package.

Statement by the National Cotton Council
on
Cap-and-Trade Legislation for Greenhouse Gas Emissions
July 21, 2009

The National Cotton Council (NCC) is the central organization of the U.S. cotton industry representing producers, ginners, oilseed crushers, merchants, cooperatives, textile manufacturers, and cottonseed handlers and merchandisers in 17 states stretching from California to the Carolinas. Taken collectively, the annual economic activity generated by cotton and its products in the U.S. economy is estimated to be in excess of $100 billion.

The impacts of a greenhouse gas cap-and-trade program on U.S. agriculture have been the source of significant debate during the legislative discussions surrounding H.R.2454, the American Clean Energy and Security Act (Waxman/Markey bill). Unfortunately there is very little economic analysis available to guide the discussions at this time.

It is generally accepted that energy and input costs for production agriculture will increase under a cap-and-trade system. However, the estimates of such cost impacts to agriculture have varied broadly. Preliminary studies at the University of Missouri and Iowa State University project a modest increase of less than 5% by 2020 for corn production costs while the Food and Agricultural Policy Research Institute (FAPRI) estimate the Waxman/Markey bill will cost the average Missouri farmer an additional $11,000 in 2020 and more than $30,000 a year by 2050.

NCC's preliminary analysis of direct energy costs related to production, ginning, marketing, and yarn spinning indicates that every 10% increase in input prices will increase costs by at least $175 million. This estimate, which should be viewed as a lower bound, does not fully account for the ripple effects that higher energy costs will have on all industries that supply inputs to the U.S. cotton and textile industry. Textile processing beyond spinning, including fabric formation and dyeing and finishing are also projected to experience significant cost increases as a result of a cap and trade regime similar to Waxman-Markey.

Some agricultural organizations are evaluating potential sale of offsets as a means to mitigate increased production costs. But the estimated value of offsets varies. U.S. cotton farmers will receive very little benefit from agricultural offsets. Western cotton states do not have the capacity for soil carbon sequestration, many cotton operations are not suited for no till production, cotton produces comparably little biomass, and currently has no potential for biofuels production. NCC's assessment of the value of agricultural offsets is supported by recent EPA and Congressional Research Service analyses which show little potential for offsets in row crops and a significant sequestration potential in forestry. High incentives for afforestation projects could also have the unintended consequence of shifting land out of crop production.

Upon consideration of the broad impacts of such legislation, NCC has concluded that higher energy and other production input costs in every sector of the U.S. cotton industry will outweigh any benefits resulting from offsets.

NCC is also deeply concerned about the competitive disadvantage cap-and-trade legislation would create for U.S. cotton and cotton products. China and India are two of the largest cotton and textile producing countries and as such are competitors with U.S. cotton and cotton products in domestic and international markets. Both countries are significant and growing greenhouse gas emitters and both have, thus far, refused to sign onto any agreement with emission reduction targets. The additional production costs that

will result from implementation of a cap-and-trade regime will place U.S. cotton and cotton products at a clear disadvantage in domestic and international markets, which are critically important to the U.S. cotton industry.

For these reasons, NCC urges the Senate to (1) insist on more detailed economic analysis on a crop by crop and industry by industry basis and (2) in the absence of such analysis to either reject the cap and trade program included in the Waxman-Markey legislation or develop a plan to provide financial assistance to industries that will experience significant increases in costs of production but in the absence of assistance or border measures will be unable to compete in domestic and international markets with products produced in countries unencumbered by commitments to cap GHG emissions.

Written Statement of the
National Oilseed Processors Association
Submitted to the
Committee on Agriculture, Nutrition and Forestry
United States Senate
July 22, 2009

The National Oilseed Processors Association (NOPA) offers its thanks and appreciation to Chairman Harkin and Ranking member Chambliss for holding this hearing "The Role of Agriculture and Forestry in Global Warming Legislation." NOPA also thanks you for the opportunity to submit for the record NOPA's views regarding the potential impact of global climate change legislation on the oilseed processing industry.

NOPA is a national trade association comprised of 16 companies engaged in the production of food, feed and renewable fuels from oilseeds, including soybeans. NOPA's 16 member companies process more than 1.7 billion bushels of oilseeds annually at 66 plants located throughout the country, including 61 plants which process soybeans.

We respectfully provide you with our perspectives as your Committee begins consideration of global climate change legislation and how such legislation may impact oilseed processors. Appended to our Written Statement is a document entitled "Questions & Answers Regarding the Potential Impact of Global Climate Change Legislation on U.S. Oilseed Processors."

Climate Change is a Global Challenge

Climate change is a global challenge requiring multilateral solutions that do not shift the economics of agricultural production, processing and manufacturing of food and feed products and renewable fuels. Rising energy costs commensurate with either a carbon tax or an emissions cap imposed on U.S. operations would threaten the viability of not only the energy-intensive, import/export-sensitive U.S. oilseed processing industry, but other sectors of manufacturing in the U.S., resulting in some companies facing the decision to move operations out of the country.

One such industry that could face this decision is an industry that supplies a critically needed raw material to U.S. farmers - the U.S. fertilizer industry. Currently, the U.S. imports about 55 percent of the nation's nitrogen needs, with U.S. farmers competing with farmers around the world for fertilizer nutrients. Of these imports, 82 percent comes from countries that lack climate change policies.

Were companies such as fertilizer producers to move operations out of the country, the result would be a transfer, not a reduction, of global greenhouse gases (GHG) emissions and jobs. In fact, the climate change problem could be exacerbated to the degree that those operations are transferred to countries that use energy sources that are more carbon intensive.

Hence, legislation must ensure that developed and developing nations alike share responsibility for addressing climate change. Additionally, any emission reductions from such legislation must be verifiable and enforceable, particularly with respect to impacts on international trade.

NOPA opposes any unilateral climate-related legislation that calls for either a carbon tax or a mandatory cap on GHG emissions. We do not believe sufficient effort has been put towards the development of voluntary initiatives that provide the framework for effective, voluntary, pro-growth, technology-driven approaches to reduce energy use, and thereby achieve GHG reductions in an economically sound manner. We believe that global GHG emissions are best addressed through voluntary initiatives, as well as through increased research, development and deployment of innovative breakthrough technologies.

NOPA believes that a full review of the benefits and costs of carbon tax and cap-and-trade programs should be undertaken. NOPA and its members are focused on solutions that will continue to promote U.S. agriculture and the food, feed and renewable fuels industry. In a high-volume, low-margin business environment like the one in which our members operate, domestic production can quickly move to foreign competitors, at the expense of U.S. production and jobs. If implemented in an aggressive or reckless manner, either a carbon cap-and-trade or carbon tax program would have disastrous economic consequences on the U.S. oilseed processing industry. It would result in higher food, feed and renewable fuel prices to the degree that the industry could not absorb the associated costs, and would make the oilseed processing industry much less competitive on exports to other countries. The net effect would be the loss of jobs in the industry, reduced revenue for farmers and processors, as well as increased food and renewable fuel prices for consumers.

Distribution of Allowances

If a cap-and-trade approach is taken we believe that it will work best — both for the oilseed processing industry and all energy-intensive sectors — if allowances are distributed proportionately to each industry's emissions, thereby mitigating the direct and indirect impacts on all regulated industries. Such a proportionate allocation would be the fairest system, because it would avoid arbitrarily picking winners and losers and assist all industries in making the challenging transition to a low-carbon economy. A fair distribution of allowances would allocate an appropriate percentage of allowances to the food, feed and renewable fuels sector. It would also avoid the impression that the allowances represent subsidies to favored industries — an accusation that could subject the U.S. to World Trade Organization (WTO) disputes, and American companies to retaliatory tariffs. We cannot demonstrate international leadership by approving GHG legislation that undermines our international credibility on trade liberalization.

Any cost of allowances for entities that emit more than 25,000 tons of GHGs will be directly added to the operating cost of each facility. One can safely assume that firms necessarily will need to cover added costs by passing them forward in the supply chain. This inevitably will impact costs for consumers, returns for processors, or a combination of both. However, there comes a point where it is no longer possible to pass on all of such costs in a globally competitive market. Therefore, without an appropriate allocation of allowances, processing firms in the United States may not remain viable.

World Trade Organization Obligations

Any U.S. carbon reduction program must be structured in a manner to protect our competitive advantage, recognizing that many of our competitors likely do not have similar policies in place.

Structuring a program in this manner will be a huge challenge, considering our WTO commitments. Any U.S. carbon reduction program could lead to allocation schemes and trade mechanisms that could face WTO challenges, already a very complex problem. Designing a program/scheme to address leakage without risking retaliation from our overseas customers will be a very difficult task. Designing a program/scheme to address leakage without risking retaliation from our overseas customers will be a very difficult task. If the U.S. fails in this task, the current global recession we are experiencing could be exacerbated by a wave of international protectionism.

Federal Preemption of Regional, State and Other Carbon Reduction Programs

The oilseed processing industry supports federal preemption of all regional, state and other carbon reduction programs or, at a minimum, the harmonization of these climate initiatives. Any legislation that allows regions, states, and other entities to pursue their own programs will only lead to confusion, multiple sets of recordkeeping, and additional expense, all of which would serve to undermine regulatory effectiveness, create investment uncertainty, and negatively impact U.S. competitiveness. The objective should be to avoid unnecessarily driving up compliance costs and making environmental goals more difficult to reach. To the degree that these other climate initiatives remain, it is paramount they be harmonized with the federal program to eliminate the cost and chaos multiple independent systems would impose on the regulated sectors.

NOPA Statement of Principles on Global Climate Change Legislation

(1) Climate change is a global challenge and requires a global solution; any U.S. action must require comparable action by developed and developing countries alike.

   (a) Our industry is an import/export-sensitive one; our customers are import/export-sensitive as well; everything that we and they produce can be produced across the border or overseas.

   (b) The global playing field must be level or the U.S. food, feed and renewable fuels industry will become non-competitive.

   (c) Climate change is a global challenge that cannot be solved by any one nation acting unilaterally.

   (d) Without multilateral action, jobs and emissions will simply shift across the border or overseas to countries that require few, if any, environmental protections, harming both the global environment (via "carbon leakage") and the U.S. economy.

(2) Voluntary initiatives should serve as the framework for effective, voluntary, pro-growth, technology-driven approaches to reducing energy use and achieving greenhouse gas (GHG) emission reductions in an economically sound manner.

(a) The oilseed processing industry is an energy-intensive one, but emits comparatively small amounts of GHGs.

(b) The food industry as a whole contributes roughly less than 2 percent of domestic GHG emissions, and emissions from our segment of the industry are only a small fraction of that total.

(3) Global GHG emission reductions should not be addressed by mandates and bureaucracy, but rather by technology-driven initiatives where industry and government work together to provide funding for increased research, development and deployment of innovative breakthrough technologies.

(4) Greenhouse gas emission reductions must be workable, verifiable, enforceable, flexible, transparent and global in scope.

(a) The Clean Air Act is not a viable or reasonable vehicle to address a global challenge like climate change, because it was designed to address local, regional and national, not global, environmental quality.

(b) Any federal program should preempt all regional, state or other carbon reduction initiatives or, at a minimum, harmonize these initiatives.

(c) Any program that encourages removing arable land from production could severely strain the ability of the food, feed and renewable fuels industry to meet worldwide demand.

(5) Any legislation must be consistent with WTO obligations; to do otherwise is to face almost certain retaliation from our trading partners.

Conclusion

During these difficult economic times, we believe it is unwise to insert additional economic uncertainties into an already fragile marketplace without full consideration of the consequences. In the event the Senate acts to limit GHG emissions, we believe a full review of the benefits and costs of the legislation should be undertaken.

Thank you for allowing NOPA to share its views on global climate change legislation. Attached is a question-and-answer document more fully outlining NOPA's views regarding the potential impact of global climate change legislation on the oilseed processing industry. We look forward to working with you and members of the Committee in addressing the challenges and opportunities facing businesses across the country, but in particular rural businesses that serve domestic farmers and livestock and poultry producers.

Appendix.
Questions & Answers Regarding the Potential Impact of Global Climate Change Legislation on U.S. Oilseed Processors

Q1 Members of Congress have introduced numerous bills to address the wide spectrum of climate change issues. Do you think Congress should enact a program that uses a carbon cap-and-trade program?

A1 Were Congress to move forward in designing a cap-and-trade program, NOPA would favor a program that:

(a) Provides for comprehensive legislation rather than EPA regulation under the Clean Air Act and preempts or, at a minimum, harmonizes state, regional and federal climate initiatives;
(b) Provides maximum avenues to free allowances, a robust credit system and built-in flexibility;
(c) Is economy-wide in reach, rather than targeting a single sector for emissions reductions;
(d) Is inclusive of all six GHGs, not just CO2;
(e) Is global in scope, guarding against carbon and job "leakage," and compatible with WTO obligations/commitments;
(f) Is permissive of excess allowance carryover;
(g) Sets a ceiling and safety valve in the setting of the price for allowances;
(h) Recognizes voluntary actions taken to reduce GHG emissions prior to implementation of climate change policy;
(i) Ensures a level playing field with processors from countries with a less stringent or no GHG mitigation system; and
(j) Allows the granting of allowances for the implementation of Carbon Capture and Sequestration (CCS) projects and does not disqualify projects due to public/private participation.

Q2 If a cap-and-trade program is chosen, how should emission allowances be distributed? For example, should they be at no cost, auctioned, or a combination of both? How should Congress prioritize the distribution of available allowances? Should allowances for the agricultural and forestry sectors be allocated at no cost, if so, should there be a limit on the number of no-cost allowances?

A2 NOPA believes that, in consideration of the comparatively small amounts of GHGs the food, feed and renewable fuels industry emits and the import/export-sensitive and energy-sensitive nature of the business, the industry should receive necessary consideration to mitigate economic harm. In the event Congress elects to include the industry in a cap-and-trade program, credits should be made available and free allowances should be allocated to it, in recognition of the threat that such a program would pose to the viability of the industry. Over time, free allowances could be phased out if climate change costs

are harmonized globally on an industry-by-industry basis. We also support setting a ceiling and safety valve in the setting of the price for allowances.

Should Congress move down the path of including the agricultural sector in a cap-and-trade program, considerable thought should be given to program design. Of particular concern to NOPA would be the unintended and problematic consequences of such an inclusion, such as agricultural producers taking arable land out of production and selling it as offsets; or, large GHG emitters buying large tracts of arable land, taking it out of production, and converting it to rangeland or trees, towards using the converted land as offsets. Any program that would encourage the taking of more arable land out of production could severely strain the ability of the food, feed and renewable fuels industry to meet worldwide demand.

Q3 *Should a cap-and-trade program or a carbon tax/fee program be linked to existing or emerging U.S. regional or other carbon reduction programs (i.e. RGGI or individual state programs)?*

A3 NOPA opposes any unilateral climate-related legislation that calls for either a carbon tax or a mandatory cap on GHG emissions. In the event Congress acts to limit GHG emissions, NOPA supports federal preemption of all regional, state and other carbon reduction programs or, at a minimum, the harmonization of these climate initiatives. Any legislation that allows regions, states and other entities to pursue their own program/approach will only lead to confusion, multiple sets of recordkeeping and additional expense, all of which would serve to undermine regulatory effectiveness, create investment uncertainty, and negatively impact U.S. competitiveness. The objective should be to avoid unnecessarily driving up compliance costs and making environmental goals more difficult to reach. To the degree these other climate initiatives remain, it is paramount they be harmonized with the federal program to eliminate the cost and chaos multiple independent systems would impose on the regulated sectors.

Q4 *If a cap-and-trade program is established, should an existing government agency regulate it or should a new agency be created?*

A4 Before creating a new agency to regulate any new program, Congress should first step back and look at which agencies have the history, experience and accountability in administering such programs. Addressing GHGs via a cap-and-trade program should not be about creating new government entities, but about maximizing use of existing departments and agencies to carry out and enforce the program. Any agency tasked with creating or regulating a cap-and-trade program must develop operating principles that are feasible, flexible, accountable, clear, and enforceable; provide for a transparent regulatory approach; allow entities impacted ample time to respond during a notice-and-comment period; and establish a methodology so that the program can be modified over time based on experience to ensure that it is periodically updated to meet new objectives and environmental issues that may arise.

The U.S. Environmental Protection Agency, which has a demonstrated history in addressing many emissions issues and experience in implementing and administering programs such as the Acid Rain Program that included an allowance trading system, should be given serious consideration for regulating any new cap-and-trade program with full consultation from USDA, DOE, USTR, DOT and the Department of State. This program should not be regulated under the Clean Air Act because it would create a conundrum of regulatory impossibilities.

Q5 *If a derivatives or futures market in carbon reduction arises in the wake of the creation of a cap-and-trade program, should the Commodity Futures Trading Commission (CFTC) continue its role as the regulator of this derivative carbon market, or should there be a different regulator?*

A5 If a derivatives or futures market in carbon reduction does arise through the creation of a cap-and-trade program, it should have proper oversight and funding and an experienced enforcement authority. As discussed above in the answer to question no. 4, every effort should be made to utilize existing government entities. Considering the CFTC's demonstrated history and experience in overseeing such a market, it should be the regulator under any new cap-and-trade program.

Q6 *Currently, derivatives of energy-based commodities can be traded through: a) highly structured instruments on regulated, transparent futures markets accessible to anybody and anyone; b) flexible instruments on lightly regulated, transparent derivative markets accessible to only major market participants, or, c) flexible instruments on unregulated, opaque over-the-counter markets accessible only to major market participants.*

Should derivatives markets in carbon reduction arising in the wake of the creation of a cap-and-trade program also be permitted to develop under similar options as for energy-based commodities?

A6 Yes, derivatives markets should be permitted to develop.

Q7 *Will enactment of a unilateral carbon reduction program have negative impacts for the U.S. oilseed processing industry or populations whose welfare is of special interest to the agriculture community? Such groups could include: residents of rural areas; agricultural producers and forest landowners; or input, transportation, and processing sectors of agriculture and forest products.*

A7 The U.S. oilseed processing industry is an energy-intensive one, but emits comparatively small amounts of greenhouse gases (GHGs); the food industry as a whole contributes roughly less than 2 percent of domestic GHG emissions, and emissions from our industry are only a small fraction of that total. Because our industry has a limited ability to pass costs on to consumers of our products, we are concerned with cost impacts, including energy price increases, to our industry.

In addition to being energy intensive, the U.S. oilseed processing industry is also subject to foreign competition. Rising energy costs commensurate with any carbon reduction program would threaten the viability of not only this industry, but other sectors of manufacturing in the U.S., resulting in companies moving more and more operations out of the country. The result would be a transfer, not a reduction, of global GHG emissions. GHG emissions would be exacerbated to the degree that those operations are transferred to countries that use energy sources that are more carbon intensive.

Enactment of a carbon reduction program could also have a significant impact on crop production, including operating costs and fixed costs. Production agriculture relies heavily on fertilizer, diesel fuel, gasoline, natural gas and LP gas for on-farm use; for the heating/drying of commodities; and for transportation of product from farm to point of sale (whether by truck, rail, barge or ship). The cost of all of these could rise dramatically as a result of rising energy costs commensurate with any carbon reduction program. All of these price increases have the potential to increase the price of food, feed and renewable fuel products accordingly.

Q8 *How might revenue generated under a carbon reduction program be best used to offset any negative impacts?*

A8 Revenue would be best used in funding necessary investment and development in new technologies such as carbon capture and storage; implementing cost-containment measures; strengthening transportation infrastructure; and ensuring that domestic businesses, farmers and ranchers are not put at an undue competitive disadvantage in the global marketplace as a result of climate change policy. A carbon reduction program should not be allowed to generate revenue for the administering entity or for international programs.

Q9 *Should businesses that are affected (either indirectly or directly) by higher overall costs due to a carbon reduction program receive transitional assistance?*

A9 Yes. To remain viable and competitive, affected businesses must have access to free allowances and auction revenue to offset the costs of any carbon reduction program, such as meeting new compliance benchmarks; installing new equipment to mitigate GHGs; utilizing new carbon capture and storage technologies; and higher energy costs.

Q10 *What role should public lands play in helping to sequester carbon and/or reduce greenhouse gas emissions?*

A10 Use of public lands in helping to sequester carbon could serve to lessen the impact of any carbon reduction program on U.S. oilseed processing or other manufacturing operations. Additionally, there may be an opportunity for government and business to work together to identify opportunities for using such lands for renewable fuels production.

Q11 Should carbon prices be determined exclusively by market forces or should limits on carbon prices be established?

A11 Initially, it is critical that allowances be free or that a significant portion of allowances be distributed to capped entities and economically disadvantaged sectors for their use in offsetting economic impacts and funding research and development on carbon reduction technologies. Eventually, these free allowances could be phased out if climate change costs are harmonized globally on an industry-by-industry basis. We support setting a ceiling and safety valve in the setting of the price for allowances.

Q12 The administration and implementation of an offset or allowance program will be a major topic during any potential climate change discussion. How should Congress prioritize the distribution of available offsets (who gets them and how much)?

A12 Offsets should be available to businesses most heavily impacted by any carbon reduction program, including businesses most disadvantaged in the global marketplace as a result of the program. We support a transparent process vetted through the public comment process that defines the source of the offsets and the size of the offset pool.

Q13 Should Congress be concerned about any unintended consequences resulting from a unilateral GHG reduction program?

A13 Yes – carbon leakage. Carbon leakage occurs when there is an increase of GHG emissions in one country as a result of an emissions reduction by a second country with a stricter climate policy. One of the ways carbon leakage can occur is if the emissions policy of a particular country raises local production costs. In that case, another country with a more relaxed policy might have a trading advantage. If demand for the goods being produced remains the same, production may move out of the country to the country with a more relaxed policy; global emissions may not be reduced, but could actually increase to the degree that production is transferred to a country that uses energy sources that are more carbon intensive.

Q14 *Should Congress be concerned about any adverse impacts upon U.S. agribusiness industries resulting from a unilateral GHG reduction program?*

A14 Yes. Two of the largest U.S. customers of the U.S. oilseed processing industry are the domestic livestock and poultry industries. These industries consume over 45 percent of domestic soybean production in the form of soybean meal produced by the U.S. oilseed processing industry. A U.S. carbon reduction program would have a dramatic cost impact on food production from farm to fork, including the livestock and poultry industries, and would likely lead to carbon leakage to other countries with no carbon reduction programs.

A case in point is Brazil and Argentina, which are home to the principal competitors of both the U.S. oilseed processing industry and the U.S. livestock and poultry industries. Both of these countries have the capacity to expand not only crop production and

processing, but livestock and poultry production; neither has a meaningful carbon reduction program. Should a U.S. carbon reduction program increase costs on U.S. oilseed processors and U.S. livestock and poultry producers/processors to the degree that they lose their competitive advantage relative to Brazil and Argentina, all three industries, which are import/export-sensitive, will be forced to seriously consider moving out of the U.S. Brazil and Argentina will be the likely beneficiaries. Any U.S. carbon reduction program must be structured in a manner to protect our competitive advantage, recognizing that our competitors likely do not have similar policies in place.

Q15 Should Congress be concerned about provoking any adverse international reactions resulting from a unilateral GHG reduction program?

A15 Yes. Structuring a program in this manner will be a huge challenge, considering our World Trade Organization (WTO) commitments. Any U.S. carbon reduction program could lead to allocation schemes and trade mechanisms that could face WTO challenges that are already very complex. Designing a program/scheme to address leakage without risking retaliation from our overseas customers will be a very difficult task. If the U.S. fails in this task, the current global recession we are experiencing could be exacerbated by a wave of international protectionism.

Written Testimony Submitted for the Record by PG&E Corporation

July 22, 2009

United States Senate Committee on Agriculture, Nutrition and Forestry

Full Committee Hearing on
The Role of Agriculture and Forestry in Global Warming Legislation

PG&E Corporation is an energy holding company headquartered in San Francisco, California and the parent company of Pacific Gas and Electric Company. Pacific Gas and Electric Company is California's largest utility, providing electricity and natural gas to more than 15 million people throughout northern and central California. PG&E is a recognized leader in energy efficiency and has among the cleanest mixes of electric power of any utility in the country.

PG&E has been at the forefront of the climate discussion at the state and federal levels, and our position is clear. We believe the link between greenhouse gas (GHG) emissions and the Earth's warming climate is convincing, the potential consequences are serious, and the need for action is urgent. Because emissions from the combustion of fossil fuels is the single largest contributor to global climate change, the way energy is produced, distributed and consumed has profound implications.

To combat climate change, we support the adoption of a mandatory, national, economy-wide system to reduce GHG emissions. How such a program is structured and implemented may be the single greatest factor influencing the direction of the energy industry in the decades ahead. It will also have impacts with regard to the nature of the U.S. economy for generations.

The men and women of the agricultural community who provide the food for our families are a vital segment of our society and our nation's economy that must be protected and provided opportunity under any climate change program. In 2006, California alone averaged over 377,000 agricultural jobs.[1] Sustaining and growing this job base will be critical as we transition to a new clean energy economy.

In the design of any economy wide, market-based climate protection program, we must first and foremost establish a mechanism to protect the agricultural community – both businesses and workers – from rising electricity and natural gas prices resulting from a climate change program. PG&E strongly supports the provision in the American Clean Energy and Security Act of 2009 that allocates allowances to local distribution companies with the requirement that allowance value be used solely to benefit and protect retail ratepayers – all ratepayers.

Second, we must focus on establishing and growing markets that will create supplemental revenue streams for the agricultural community while fostering environmental benefits. An excellent example of such a market opportunity is the production of renewable natural gas,

---

[1] California's Agriculture Employment 2006, http://www.calmis.ca.gov/file/agric/CA-Ag-Profile-2006.pdf

often called biogas or biomethane, from animal and agricultural waste, as well as other sources of biomass.

As one of the largest natural gas distribution companies in the nation, PG&E sees the production of biogas as a critical renewable energy supply option to meet both customer demand and compliance with increasing environmental regulation including the reduction of greenhouse gas emissions. Biogas is a renewable form of energy and can be burned onsite to produce electricity or cleaned up to a high Btu content and then injected into the extensive natural gas pipeline system and distributed for the exact same end uses as conventional natural gas.

Animal waste can be a costly burden for farmers and can contribute to significant air quality and ground water contamination problems. In addition, the methane emissions associated with animal waste have a greenhouse gas concentration of approximately 21 times that of carbon dioxide. The production of biogas using animal waste creates useful energy commodity from the methane and provides the farmer with a diversified, constant revenue stream, that is protected from cyclical natural risks such as floods or droughts, and which has significant environmental benefits.

PG&E has partnered with BioEnergy Solutions to become the first utility in California to take delivery of pipeline quality renewable natural gas (biogas) directly into its natural gas pipeline system. Once in the pipeline system, PG&E has the flexibility to use this gas supply in the exact same way as the conventional gas, such as to power furnaces, hot water heaters, and stoves in homes and businesses. Most recently, PG&E has decided to take the biogas and ship it through its pipeline system directly to its highly efficient natural gas power generating plant where in turn the Company delivers renewable electricity to its customers in central and northern California. Using biogas to power our natural gas plants provides us with credit towards complying with the state's renewable portfolio standard, which requires PG&E to deliver 20 percent of its electricity from renewable power by 2010. In addition, the system built by BioEnergy Solutions reduces emissions of methane by 70 percent on a 5,000-cow dairy farm, making the production of biogas not only a clean, domestic source of renewable energy, but also a clear solution to reducing greenhouse gas emissions.

In California alone, there are nearly two million dairy cows which provide great potential for the state's agriculture and power sectors to work together to address the challenges of climate change. The same is true for many other states where the agricultural community plays a major role in economic stability. For example, PG&E is taking delivery of renewable natural gas into its pipeline system from a farm in Texas through a partnership with Microgy, a subsidiary of Environmental Power Corporation.

The environmental and economic benefits of producing renewable natural gas from agricultural waste are extensive; however, the market has been slow to develop due in part to the high upfront costs to install the digester and gas clean-up equipment. In order for renewable natural gas to become a more widespread market opportunity within the agricultural community, there needs to be an increase in market demand for this renewable energy source. Following are legislative recommendations that would expand demand for biogas and eventually bring the cost down for farmers to initiate projects.

- Include renewable biogas as an acceptable renewable energy source in the federal renewable electricity standard, as in the case of the American Clean Energy and Security Act of 2009. According to the California Public Utility Commission's July 2008 Renewables Portfolio Standard Quarterly Update, the lowest cost renewable resource is biogas.[2]

- Exempt renewable biogas from requiring a compliance obligation for natural gas local distribution companies just as electricity from renewable biomass is exempted from requiring a compliance obligation for electric local distribution companies. Utilities will be incented to purchase renewable natural gas if it does not require a carbon allowance.

- Establish a production tax credit for renewable natural gas as proposed in the Biogas Production Incentive Act of 2009, HR 1158 and S 306, as a way to improve the economics of a biogas project such that additional farmers would consider entering the market and expand biogas supply into the market.

This distinguished Committee has the opportunity to help craft legislation that will transform the way we produce and consumer energy for generations to come. The agricultural community has the opportunity to play a vital and expanded role in the nation's energy security, economic rebirth and environmental stewardship through thoughtful policy development. Renewable natural gas is one of the greatest keys to unlocking this opportunity, and the time is now to unleash this untapped market potential.

[2] Renewables Portfolio Standard Quarterly Report, California Public Utility Commission, http://docs.cpuc.ca.gov/word_pdf/REPORT/85936.pdf, page 12.

SynGest

For more information, contact
Jack Oswald (415) 986-8300
Tade Sullivan (515) 321-9889

SynGest intends to build a $105 million BioAmmonia (anhydrous ammonia) plant at on 75 acre site near Menlo, Iowa, (approximately 40 miles west of Des Moines) in the heart of our nation's largest corn producing region.

The proprietary production process uses discarded corn cobs (or other biomass products) to produce anhydrous ammonia, a key source of nitrogen fertilizer used in the production of corn and other life-sustaining crops. The United States has dwindling capacity to produce this fertilizer; more than 50% is imported from foreign sources; over 20% of the imported supply originates from Russia alone. The result has been devastatingly high prices for ammonia – At the peak of the market in the spring of 2009, Iowa prices were nearly $1,400/ton, up from $250/ton only two years ago.

Investors	
SynGest Principals	$ 6 Million
Regional Coop	$17 Million
Private Equity Fund	$15 Million
Enlisted Support	
Guthrie County – TIF	$20 Million
IFA Waste Bonds	$30 Million
Support Pending	
Iowa DED	$2.5 Million
Iowa Power Fund	$2.5 Million
DOE Grant	$50 Million

The process will turn 130,000 tons of corn cobs into 50,000 tons of ammonia and 8,000 tons of bio-char, a valuable soil conditioning agent that significantly increases crop yields. This plant alone will supply enough nitrogen to fertilize 500,000 acres of corn.

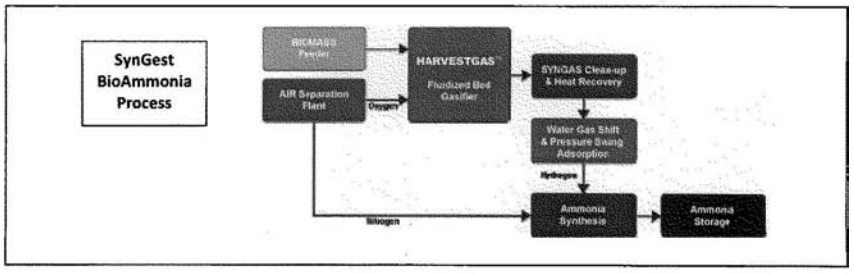
SynGest's initial goal is to build at least 12 plants in Iowa -- were Iowa to use this process exclusively, it would only take 1/3 rd of Iowa's annual corn cob production to produce enough anhydrous ammonia to supply the entire state. Additional facilities, pending availability of biomass supplies, will be erected for the production of advanced biofuels with the potential to make Iowa energy independent and a net exporter of energy.

Economic Impact

- **$105 million invested** in plant construction and equipment
- **500 highly-skilled and well-paying construction jobs** will created (including union labor)
- **40 full time jobs**, with an average compensation of $50,000 **and a total of 200** when including support and logistics
- **$7,000,000.00 in new income for area farmers**, by purchasing their previously discarded corn cobs
- **Reduced price volatility for nitrogen fertilizier** - a key input for Iowa's farmers

Environmental Impact

- Turns a heavily carbon-producing (CO_2)process into a carbon-negative process
- Process virtually eliminates the use of fossil fuels to produce anhydrous ammonia
- Maintains healthy levels of crop residue, while reducing waste products from production of corn



The Dow Chemical Company

STATEMENT FOR THE RECORD

SUBCOMMITTEE ON ENERGY, SCIENCE, AND TECHNOLOGY
COMMITTEE ON AGRICULTURE
UNITED STATES SENATE

HEARING ON

The Role of Agriculture and Forestry
in Global Warming Legislation

July 22, 2009

The Dow Chemical Company appreciates the opportunity to submit these written comments to the Committee on Agriculture, Subcommittee on Energy, Science, and Technology.

Dow was founded in Michigan in 1897 and is one of the world's leading manufacturers of chemicals, plastics and advanced materials. We supply products to customers in 160 countries around the world, connecting chemistry and innovation with the principles of sustainability to help provide everything from fresh water, food, and pharmaceuticals to paints, packaging, and personal care products

Dow is committed to sustainability. We have reduced our absolute levels of greenhouse gas (GHG) emissions 22% since 1990, and we are committed to do even better in the future. Our ambitious 2015 sustainability goals underscore this commitment.[1]

Dow operates at the nexus between energy and all the manufacturing that occurs in the world today. Over 90% of the products made have some level of chemistry in them, so no one has more at stake in the solution - or more of an ability to have an impact on - the overlapping issues of energy supply and climate change than we do.

As a world leader in chemistry, Dow is uniquely positioned to continue to provide innovations that lead to energy alternatives, less carbon intensive raw material sources, and other solutions not yet imagined. In fact, our science and technology has been contributing solutions to the global climate change and energy challenges. Our science has led to the development of alternative energy sources such as biofeedstocks, photovoltaics and wind. Many of our products contribute to reduced energy consumption.

This testimony describes the views of The Dow Chemical Company on global climate change legislation and particularly on the important role played by agriculture.

Dow Perspective on Climate Change

Dow accepts the Intergovernmental Panel on Climate Change (IPCC) conclusion that it is very likely that human activities are causing global warming. Left unchecked, the increase in GHGs poses a significant hazard, and the world's response must be comprehensive, far ranging, and expeditious. We recognize the serious nature of the threat and it warrants bold action with clear, long-term performance objectives.

In the long term, innovation in the technologies of renewable and alternative energy will play a significant role in meeting the world's energy needs and will have a positive impact on climate change. However, those that implement alternative and renewable energy sources must be accountable to demonstrate the economic and ecological sustainability of those solutions.

---

[1] To learn more about Dow's commitment to sustainability, go to our website at www.dow.com.

Traditional fossil fuels (oil, natural gas, and coal) will remain critical to meeting energy and feedstock needs until new technologies can substitute into the existing mix. Efficient use of these limited resources with an emphasis on carbon management must be a strong component of any climate change strategy.

The long-range nature of the climate change issue requires different solutions over successive timeframes. The effect of climate change is global and will require immediate action by all major GHG emitting industry sectors and countries. A global climate change strategy calls for sharp, firm, and direct action now to dramatically slow, stop, and then reverse the growth of greenhouse gas levels in the atmosphere.

Dow supports the concept of multiple solutions to reduce GHG emissions, as outlined by Princeton Professors Socolow and Pacala in their article, "A Plan to Keep Carbon in Check", which appeared in the September 2006 issue of *Scientific American*. Agriculture is responsible for two (biomass fuels and natural sinks) of the eight solutions—or wedges—identified by Socolow and Pacala to reduce global GHG emissions.

Dow is implementing its solutions in the context of the wedge stabilization model developed by Professors Socolow and Pacala. We will hold ourselves accountable to apply our innovation and expertise in helping to solve the world's GHG and energy challenges.

Need for Prompt Action by Congress

As a member of the U.S. Climate Action Partnership (USCAP), Dow supports prompt enactment of environmentally effective, economically sustainable and fair climate change legislation to reduce U.S. greenhouse gas emissions sharply by mid-century. The centerpiece of legislation should be an economy-wide cap and trade program. This market-based approach is the best way to put a price on carbon and ensure that short- and long-term emissions targets are met. A price on carbon is also the best way to spur the development of new and breakthrough technologies, which are necessary to reduce GHG emissions while growing the economy. It is important to note that the recommendations of USCAP include several complementary policies in addition to cap and trade, such as policies to promote energy efficiency in the building sector. These complementary policies are needed to achieve the economy-wide GHG reduction targets.

While Congress takes the necessary first step by creating a US program, the Administration should engage in international negotiations with the aim of establishing emission-reduction commitments by all major-emitting countries. The post-2012 global framework should in addition establish further international GHG markets and boost support for climate-friendly technology in developing countries. Dow recognizes, however, that each country should be allowed to establish its own system, with targets fairly set for each sector. Optimum solutions for the US can differ from what works best in China or India, although competitive distortions must be minimized during the transition while country reduction targets converge.

In December, the global community will meet in Copenhagen under the UN process to negotiate a new international post 2012 framework for reducing GHG emissions. Ideally, legislation to reduce GHG emissions needs to pass through both chambers of Congress for the US negotiating team in Copenhagen to have clarity on what they can reasonably commit to. This is why the Senate should take action this Fall: to provide clarity on US climate change leadership to the world as this will be essential to securing a viable international agreement to reduce global GHG emissions.

It is important to note that the EPA is moving to regulate GHG emissions under the authority of the Clean Air Act (CAA). Dow believes that the CAA does not provide the authority to develop a cost-effective program for reducing GHG emissions in the United States. Consequently, we urge the executive branch to work closely with the legislative branch to (1) avoid spending resources developing ill-advised regulatory programs and (2) develop a new, market-driven program to reduce GHG emissions that is both economically sustainable and environmentally effective.

Importance of Offsets under a Cap and Trade Legislation

Dow favors the creation of high-quality offsets for compliance with any US cap and trade program. Offsets—and, in particular, legitimate, high-quality (additional, permanent, verifiable, enforceable) offsets—help to reduce the total cost of cap and trade; indeed, EPA analysis shows that offsets are one of the biggest determinants of the cost of compliance. The more high-quality offsets, the lower the total cost of the program. International and domestic offset projects will reduce emissions, while enabling regulated sectors the freedom to select the most economically sustainable option for compliance. This is good for the economy and the environment.

Dow is developing offset projects around the world, but only if such projects have a direct positive impact on the company, either through promotion of a Dow product, advancement of a Dow technology, or in reducing emissions at a Dow facility. For these reasons, it is puzzling to hear some Members of Congress complain that international offset projects send US money abroad and don't benefit the country. Our international offset projects benefit Dow directly, and policies that inhibit the development of high-quality offsets are detrimental, not beneficial, to Dow and to any US company that seeks a range of cost-effective options for compliance under a US cap and trade program.

Dow is concerned that the House-passed bill imposes certain procedural hurdles that will prevent legitimate, high quality, domestic and international offsets—including agricultural offsets—from being developed and utilized. These hurdles will delay the implementation of offset projects that would reduce GHG emissions. Specifically, we are concerned about the requirement for EPA to regulate small sources of GHG emissions, which could eliminate a large source of domestic offsets in the early years of the program. We are also concerned that the House-passed bill requires international offsets to only come from developing countries that have a bilateral agreement with the USA and only if such offsets conform to as-yet-unwritten regulations for sectoral offsets. In addition, we are concerned about the requirement for a 1.25:1 ratio of international

offsets to allowances. We recommend modification or elimination of such procedural hurdles to better encourage the development of legitimate, high-quality offset projects both domestically and internationally.

Dow AgroSciences Products Will Reduce GHG Emissions

Dow AgroSciences has been providing a well proven, environmentally beneficial technology known as nitrification inhibitor technology (NIT) to agriculture for more than thirty years. This technology helps protect the environment by significantly reducing both nitrate movement into water and the emission into the atmosphere of nitrous oxide, a greenhouse gas more than 300 times more potent than CO_2, from cropland treated with anhydrous nitrogen fertilizer and/or manure. For corn cropland, NIT would reduce emissions equivalent to about ¼ ton of CO_2 per acre and there are approximately 40 million acres of corn that could currently benefit from this technology resulting in a possible reduction in the emissions of an equivalent of about 10 million tons of CO_2. NIT has the additional benefit of reducing inputs for users because it retains nitrogen fertilizer in the soil thus mitigating the need to apply more nitrogen fertilizer that would have otherwise been lost.

New developments with this technology will significantly expand its usage to include multiple new applications, such as with other types of nitrogen fertilizers and use with livestock waste management. Under a cap and trade system with appropriate offset provisions, NIT will provide users in the agriculture community a reliable method to reduce emissions and provide the opportunity to sell these reductions, thus providing the users a source of additional revenue.

Dow recommends that NIT be considered among the first types of offset projects approved for use under any cap and trade program established by the federal government to control GHG emissions.

Furthermore, Dow AgroSciences is the leader in developing and providing new technologies in the area of crop protection chemical and seed genetics that growers, farmers and ranchers use to help crop and range plants thrive better thus increasing the ability of the plants to improve photosynthetic capacity which directly extracts CO_2 from the atmosphere. Bigger plants and higher yields require more CO_2 to be removed from the atmosphere. In addition, Dow AgroSciences provides technologies that help growers farm using no-till techniques which have proved to improve carbon sequestration in the soil.

Better genetics through biotechnology and conventional plant breeding is resulting in plants with higher yields using the same or less nitrogen thus directly reducing nitrous oxide emissions that accompany nitrogen fertilizer applications.

Conclusion

As a world leader in chemistry, Dow is uniquely positioned to continue to provide innovations that lead to energy alternatives, less carbon intensive raw material sources, and other solutions to reduce GHG emissions.

Dow supports the concept of multiple solutions—or wedges—to reduce GHG emissions, as outlined by Princeton Professors Socolow and Pacala in their article, "A Plan to Keep Carbon in Check", which appeared in the September 2006 issue of *Scientific American*. Agriculture is responsible for two (biomass fuel and natural sinks) of the eight wedges identified by Socolow and Pacala.

As a member of the U.S. Climate Action Partnership (USCAP), Dow supports prompt enactment of environmentally effective, economically sustainable and fair climate change legislation to reduce U.S. greenhouse gas emissions sharply by mid-century. The centerpiece of legislation should be an economy-wide cap and trade program. This market-based approach is the best way to put a price on carbon and ensure that short- and long-term emissions targets are met.

Offsets—and, in particular, legitimate, high-quality (additional, permanent, verifiable, enforceable) offsets—help to reduce the total cost of cap and trade; indeed, EPA analysis shows that offsets are one of the biggest determinants of the cost of compliance. The more high-quality offsets, the lower the total cost of the program International and domestic offset projects will reduce emissions, while enabling regulated sectors the freedom to select the most economically sustainable option for compliance. This is good for the economy and the environment.

Dow is concerned that the House-passed bill imposes certain procedural hurdles that will prevent legitimate, high quality, domestic and international offsets from being developed and utilized. These hurdles will delay the implementation of offset projects that would reduce GHG emissions. We recommend modification or elimination of such procedural hurdles to better encourage the development of legitimate, high-quality offset projects both domestically and internationally.

Dow AgroSciences has been providing nitrification inhibitor technology (NIT) to agriculture for more than thirty years. This technology helps protect the environment by significantly reducing nitrate movement into water and nitrous oxide emission into the atmosphere from cropland treated with anhydrous nitrogen fertilizer and/or manure. NIT should be considered among the first types of offset projects approved for use under any cap and trade program established by the federal government to control GHG emissions.

The Fertilizer Institute

Nourish, Replenish, Grow

Written Statement of The Fertilizer Institute
to the
U.S. Senate Agriculture Committee
July 23, 2009

The Fertilizer Institute (TFI) respectfully submits the following written statement regarding our industry's perspective on climate change policy.

All farmers rely on our products to produce food, feed, and now fuel, with corn being the nation's largest fertilizer consuming crop. Since the introduction of the American Clean Energy and Security Act of 2009 (H.R. 2454) in the House, we have been expressing serious concerns with the impact of this legislation on the fertilizer industry, its farmer customers and the U.S. food supply. We are particularly concerned that a flawed economic analysis of this legislation conducted by the U.S. Environmental Protection Agency (EPA) is preventing the American public from receiving the complete story on the devastating impact such policy could have on the U.S. economy, particularly on our farmer customers' pocketbooks.

The fertilizer industry makes an essential contribution to our food supply. TFI member companies supply nitrogen, phosphate, potash and other plant nutrients to farmers who grow food for America's dinner tables. Nitrogen is the primary building block for all organisms. It is essential to making proteins, helps keep plants green and is an essential component of soil structure. Phosphorus helps plants use water efficiently and potassium helps with photosynthesis and helps to protect plants from extreme temperatures, weeds and insects. Used together, these fertilizer nutrients help feed the world by increasing farmer's yields by as much as 60 percent.

While we are most proud of our role in feeding people, we also grow healthy local economies. A new study conducted by Charles River Associates (CRA) finds that the fertilizer industry contributes $57.8 billion dollars to the U.S. economy and supports more than 244,000 jobs nationwide. According to the CRA report, the average compensation of the 24,000 employees in the fertilizer manufacturing sector is 78 percent higher than the average U.S.

Union Center Plaza
820 First Street, NE Suite 430
Washington, DC 20002

202.962.0490
202.962.0577 fax
www.tfi.org

worker's compensation. These jobs help local economies flourish and are often the best employment opportunities in the mostly rural communities that they support.

Fertilizer manufacturing is a trade and energy intensive industry and will be significantly impacted by a cap and trade system because it is uniquely sensitive to the price of natural gas which is required to make nitrogen. We use natural gas as a feedstock in a fixed chemical process that combines nitrogen from the air and hydrogen from the gas to produce nitrogen fertilizer, in a form that the plant can take up. Unless the laws of chemistry change, there is nothing we can do to alter this process and, consequently, as much as 90 percent of the cost of producing a ton of ammonia, the building block for all other nitrogen fertilizers, can be tied directly to the price of natural gas. In 2008, the nitrogen fertilizer industry spent $3 billion on natural gas. Each $3 MMBtu increase in the cost of natural gas raises nitrogen fertilizer production costs by over $1 billion. These are not costs we can pass on to our customers as our industry is a price taker in the global fertilizer market.

Historically, the cost of natural gas has exacted a heavy toll on America's nitrogen fertilizer producers and the farmer customers they supply. Specifically, since 1999, the U.S. nitrogen industry has closed 26 nitrogen fertilizer production facilities, due primarily to the high cost of natural gas. Currently, only 30 nitrogen plants are still operating in the United States and over 55 percent of the U.S. farmer's nitrogen fertilizer is imported. Of this imported fertilizer, 82.7 percent comes from countries without climate change policies in place to regulate carbon and a majority of these countries are those from whom we are striving for energy independence.

Last year, TFI commissioned a study on the impacts of high energy costs resulting from a cap and trade system on American farmers. Using the Lieberman Warner bill as a baseline and EPA's moderate economic analysis of the impacts of the legislation on energy prices, Doane Advisory Services measured the production cost increases for eight farm commodities. Doane economists found that any such cap and trade system would add $8.5 - $17 billion to total crop and livestock production costs, resulting in a significant decline in farm income. U.S. Department of Agriculture (USDA) data shows that energy costs have already dramatically impacted farm production expenses and income. As energy costs increased, U.S. production costs of corn, soybeans, wheat, cotton, rice, sorghum, barley and oats exhibited their largest increase in history, in both absolute and percentage terms, over the period 2000-2007. This legislation will further negatively impact U.S. farmers' ability to make a living.

To date, the 2008 Doane study remains the most referenced economic analysis of the impact of cap and trade legislation on U.S. agriculture. The Doane analysis of Lieberman Warner was well received and frequently referenced precisely because it utilizes reasonable and reliable published government data. TFI and Doane eagerly awaited EPA's economic analysis of the American Clean Energy and Security Act of 2009 so Doane could conduct an economic analysis of the new bill. We were incredibly disappointed to then discover the unrealistic assumptions that were used in the EPA's economic analysis of the new House legislation, which resulted in a gross underestimation of the impact of the bill on future natural gas prices. Without a more reasonable estimation of the economic impact of the Waxman Markey bill, it will be virtually impossible for Doane or any other entity – including other government agencies such as USDA – to determine what impact this legislation will have on U.S. farmers.

Energy prices are determined by the intersection of supply and demand, and the EPA economic analysis both underestimates new energy demand while overestimating new U.S. energy supply that could come on-line. The Agency assumes massive increases in the available sources of renewable energy and huge gains in U.S. energy efficiency. Even EPA's baseline scenario is at odds with other government sources; forecasting energy demand in 2030 at 2.7 quadrillion Btu's or 2.4 percent lower than the U.S. Energy Information Administration (EIA) latest forecast. According to its Web site, EIA is the statistical agency of the U.S. Department of Energy and as such is the nation's premier source of unbiased energy data, analysis and forecasting. By law, EIA's products are prepared independently of administration policy considerations.

EPA also relies on questionable assumptions in its forecast of a 96 percent increase in the supply of nuclear power between 2010 and 2035 and a 157 percent increase in nuclear power between 2010 and 2050. It is well documented that nuclear power is currently very near maximum production using current capacity. In 2008, nuclear utility generation operated at over 95 percent of capacity. These near-full capacity levels of production will require more than doubling of current nuclear production capacity. This does not take into account any future de-commissioning of existing nuclear power plants.

Finally, the EPA analysis appears to ignore energy price implications of the enormous potential capacity and economic incentives that exist for domestic electricity generation to switch to natural gas as a feedstock. Currently, 29 percent of U.S. natural gas supply goes to electricity

generation. There is ample existing capacity (nearly 75 percent of the existing capacity to produce electricity from natural gas is not being utilized) to produce more electricity from natural gas and significant energy production currently coming from coal, which could easily switch to natural gas. In addition, EPA's own forecasts under the Waxman-Markey bill indicate that coal prices will increase by 81-94 percent by 2020, while natural gas prices rise by only 8.5-10.6 percent. Thus, it is not difficult to see a scenario in which significant supplies of natural gas will go to electricity generation in the future. Specifically, when faced with the option of paying 81-94 percent more for coal or only 8.5-10.6 percent more for natural gas, it is very difficult to envision a scenario where the electric generation industry will not switch to using more natural gas. When this happens, the resulting intersection of supply and demand will lead to significantly higher natural gas prices. This is a scenario with serious implications for the fertilizer industry and its farmer customers.

For these sound economic reasons, energy prices, particularly the price of natural gas, are almost certain to rise more dramatically than EPA is stating. If EPA truly believes that coal prices will increase by 81-94 percent by 2020 (by 118-141 percent by 2030 and by 300-360 percent by 2050), how does the agency justify its projection that natural gas prices will only rise by 8.5-10.6 percent by 2020 (10.4-14.8 percent by 2030 and 30.9-40.2 percent by 2050)? This inconsistent and erroneous conclusion has policy implications and TFI is particularly concerned that USDA's economic analysis, which relies on this flawed analysis, significantly underestimates the impact this legislation will have on farmers and the rural economy.

TFI urges USDA to evaluate other scenarios utilizing more realistic assumptions than those contained in the EPA analysis. Considering that, according to the EIA's own data, the price of natural gas has increased by 268 percent between 1999 and 2008, EPA's estimation that prices will only increase by 8.5-10.6 percent as a result of the Waxman-Markey bill between now and 2020 is implausible. At a minimum, USDA should be directed to run its model assuming climate legislation will increase natural gas prices by 25, 50 and 75 percent in order to present a more realistic view of what could happen to agricultural production costs under potential climate legislation. Only when more reliable data are available, can farmers make a rational decision regarding their support.

The challenge for agriculture today is to produce more food on limited arable resources. In fact, the Food and Agriculture Organization has indicated that agriculture must increase food

production by 50 percent by the year 2025 and double it by 2050. If a cap and trade system is enacted in the United States, it is imperative that American farmers are able to partially offset these additional crop production costs. Farmers should get credit for their very important role in the reduction of climate change related emissions. However, it is equally important that farmers aren't burdened with significantly increased input costs that would far exceed any offset credits they receive under the bill.

It is also crucial that the language regarding commercial fertilizer in the House passed bill be revised in the Senate bill. TFI is extremely disturbed that the House passed bill incentivizes several agricultural practices that will likely have little impact on reducing GHGs and in some cases may increase GHG emissions. We urge the Senate to act quickly to ensure that science is the basis for any grower incentives. GHG emissions can come from all types of nitrogen sources applied to the soil, regardless of whether these are applied as commercial fertilizer or manure. Whether a farmer chooses to use commercial or organic fertilizer sources, BMPs are key to managing climate related emissions.

Not only can low till and no till farming techniques help increase the carbon content of soils and reduce erosion, there are also practice based approaches such as Canada's Alberta Protocol, which is based on fertilizer best management practices (BMPs), that demonstrate farmers' capacity to reduce nitrous oxide emissions from the field. The Alberta Protocol is a peer reviewed set of fertilizer BMPs based on the 4R nutrient stewardship system, which promotes the use of the right product applied at the right rate, right time and right place. These BMPs have the potential to not only increase agricultural yields but they can also enhance fertilizer use efficiency, significantly reduce emissions of greenhouse gasses (GHGs) and improve water quality. Social responsibility and sustainability are permanent features of the fertilizer industry's goals and we believe that using practices that increase the profitability and productivity of U.S. farmland while benefiting the environment makes sense.

Fertilizer is a strategic commodity and U.S. food security cannot be attained without the use of commercial fertilizers. We urge this committee to ensure that our nation's farmers receive the best information possible regarding any climate policy's impact on their business.

The Nature Conservancy
Protecting nature. Preserving life.™

Written Testimony Before The Senate Agriculture Committee

Hearing on the Role of Agriculture and Forestry in Global Warming Legislation

Submitted by The Nature Conservancy, July 22nd, 2009

The Nature Conservancy is an international, nonprofit organization dedicated to the conservation of biological diversity. Our mission is to preserve the plants, animals and natural communities that represent the diversity of life on Earth by protecting the lands and waters they need to survive. Our on-the-ground conservation work is carried out in all 50 states and in more than 30 countries and is supported by approximately one million individual members. The Nature Conservancy has protected more than 119 million acres of land and 5,000 miles of river around the world.

The Nature Conservancy has a long track record of supporting a robust role for forests in climate policy, both globally and within the United States. We have been involved in the development and implementation of policies and project accounting standards - both voluntary and regulatory - and this written testimony is based on this experience and our belief that forest climate policy can achieve real climate and conservation benefits while providing significant new revenue opportunities for forest owners and farmers.

Forests in the United States currently sequester 12 percent of our annual greenhouse gas emissions and the U.S. Department of Agriculture estimates that this carbon storage could be doubled. Domestic forest carbon sequestration can therefore be an important component of effective climate legislation if climate legislation contains offset and other policy mechanisms that ensure environmental integrity and clear incentives. To achieve that goal The Nature Conservancy respectfully urges the Senate to strengthen domestic forest carbon provisions relative to those contained in the "American Clean Energy and Security Act of 2009 (Engrossed as Passed by House), hereinafter H.R. 2454 EH, through both a meaningful program for ***supplemental forest carbon storage*** funded through a small portion of allowance revenues and a ***forest offsets program with strong quality criteria harmonized across all project types***.

No climate legislation can be complete without a robust domestic forest and agriculture sector carbon program, and the changes we recommend below will strengthen legislation in order to achieve that important goal.

Domestic Forest Carbon Set-Aside Funding

The Nature Conservancy strongly supports an allowance allocation for achieving supplemental emission reductions in the domestic forest and agriculture sectors as a complement to a domestic offsets program. The primary purpose of such a set-aside program would be to provide incentives for small landowners and high conservation value projects that may not fare well within an offsets program. In addition, a set-aside program should include some funding for improved monitoring of domestic forests and forest carbon in order to be able to set and track program goals.

Section 788 in H.R. 2454 EH goes some way to meeting this need by providing 0.28 percent of the allowances for activities in the agriculture sector. However, the following three changes would greatly improve the effectiveness of the set aside funding in achieving meaningful climate and conservation benefits:

- *Specify the eligibility of forestland activities for incentive payments.* Although the section's reference to the agriculture sector is understood to include forest carbon activities, specific reference to forest conservation and other forest activities would provide clearer direction to USDA and greater confidence that funding would be directed to the forest sector.
- *Elaborate the criteria for eligible activities and payment levels.* The value of allowance allocation should be directed to land management activities that cost-effectively provide supplemental climate and conservation benefits. Also, it is important that the use of set-aside allowance funding be directed toward projects types that do not fare well within an offset program (e.g., small landowners). To this end, there should be greater specificity on the eligible activities and the payment levels.
- *Include a periodic assessment of aggregate climate benefits and revise eligibility and payment rules.* As stated above, allowance value should be used to cost-effectively achieve real and long-lasting climate and conservation benefits. In addition to clear program guidelines up front, this requires a periodic scientific review of how the program has performed over time. Reviews should inform regular updates of the program guidelines.

The approach of H.R. 2880 and the related "Pingree Amendment" introduced in the House discussions incorporate these suggested improvements to a large degree. Unfortunately, the Pingree Amendment was not included in H.R. 2454 EH. The Nature Conservancy recommends incorporating a similar approach in Senate legislation.

The Pingree Amendment itself could be improved by relating the payment levels to permanence of the sequestration and periodically revising program eligibility and payment rates based on the results of an assessment of program performance. The Pingree Amendment provides funding for both 15-year contracts and permanent conservation easements. Fifteen-year contracts by design allow landowners to alter land management activities if they choose not to renew the contract, with the potential for reversal of some of the accumulated carbon. In contrast, permanent conservation easements have a higher opportunity cost for landowners and longer duration of the stored carbon and deserve higher payments. Program payments should reflect differences in performance over time, with shorter contract periods receiving an appropriately lower payment level.

Domestic Offset Programs

Offsets represent a substitute compliance option for covered entities to meet required emissions reductions, and so it is essential that offsets represent real, additional, verifiable, enforceable and permanent climate benefits. Failure to meet this standard will reduce total climate benefits and, by damaging the credibility of the offset market, reduce the market-based opportunities for landowners. An overarching concern with H.R. 2454 EH is that it holds forest and agriculture offsets in Title V to different standards and procedures than other project types under Title III.

The Nature Conservancy believes that the separation of the Title V Agricultural and Forestry Related Offsets and the Title III Part D Offsets provisions is detrimental to the perception, and possibly the reality, of the integrity of the offsets credits entering the cap-and-trade system. The two Titles have different primary criteria for offsets in different sectors (e.g., for additionality). If offsets from both programs will be equally fungible compliance units within the cap-and-trade system, it is essential that the two programs do not have different offset quality criteria. An additional concern with the separated programs is that EPA could be placed in a position where it has no ability to address quality concerns impacting the broader climate program for which it is responsible. Finally, having two separate programs creates unnecessary administrative burdens on both the agencies and offset providers, and creates uncertainty in the offset market, slowing project development and the potential supply of offsets in early compliance years.

Therefore The Nature Conservancy urges that the roles of USDA and EPA be reconciled and the two programs harmonized. For administrative reasons this is probably best achieved within a single title and program but could possibly be resolved under separate programs. An approach where EPA and USDA undertake joint rulemaking in some aspects of the offsets program, and USDA has the lead in implementation for the agriculture and forest sectors, could ensure that the strengths of each agency are maximized.

Technical Issues Within Title V Offset Program. In general, The Nature Conservancy is aware of no policy rationale for different primary criteria in the two domestic offset programs, especially concerning the key criterion of additionality and baseline definition. Therefore we recommend the following modifications to the Title V Offset Program:

- *Use identical additionality and baseline definitions for all offsets.* Title V defines "additionality" as relative to what "would occur in the absence of an offset project." This is different than the definition of additionality based on doing better than business as usual performance in Title III Part D. The Nature Conservancy believes that the Title III reference to business as usual performance is a preferable approach in terms of achieving real and supplemental climate benefits. As noted above, we strongly recommend having identical definitions of additionality and baselines for all offset projects. Any justifiable differentiation can and should be left to rulemaking. (Section 504(a)(2)(A) & (B))
- *Prevent perverse incentive to clear land in the reforestation definition.* Section 503(b)(2)(A) makes afforestation and reforestation initially eligible. However, there is no cut-off date for eligibility. As a result, a landowner could clear forestland at any time (including after enactment) and receive offset credits for subsequent reforestation, ignoring the emissions associated with clearing the land. There must be an eligibility date that makes recently cleared land ineligible to prevent this perverse incentive.

- *Allow for removal of eligible project types.* Section 503(c)(1) & (2) does not specify that project types can be removed from the eligible list, in contrast to Title III Part D. The agencies should be able to specifically remove project types if it is not possible to develop sound assessment methodologies.
- *Remove the hardship provision in reversal language.* The hardship exemption for applying the reversal language is far too open-ended and could allow for very significant reversal of stored carbon, effectively undermining the overall cap-and-trade program's effectiveness. This provision should be deleted, or at a minimum restructured as a temporary extension of the timeframe for complying with reversal provisions. A temporary extension would provide for some landowner flexibility while protecting the integrity of the cap.
- *Clarify the use of Term Offset Credits.* The Section 504(d) Term Offset Credits apply for projects with 5 year crediting periods. The Nature Conservancy has some concerns that Term Offset Credits may not be properly valued in the carbon market because of the need for buyers to replace the Term Offsets every five years. This need to replace expiring Term Offsets creates significant pricing uncertainty regarding future compliance unit prices. The Nature Conservancy recommends that the existing alternative option for addressing reversals be retained. We also urge very careful consideration before the Term Offset approach be applied to forest projects, which have an inherently longer time frame, and recommend a clarification of the crediting period language under Section 504(e) to specify a period of at least 20 years for forest project types.
- *Strengthen environmental considerations for projects.* Section 510(2) now "encourages the conservation of biological diversity" rather than the Title III Part D language requiring regulations to "enhance" biodiversity. The Nature Conservancy supports the Title III language because it provides an affirmative rather than aspirational biodiversity requirement. We strongly believe that the success of the offset program could be damaged if individual projects result in a loss of biodiversity.
- *Improve transparency and public input.* The separation of Title V program, and various changes from the Title III Part D program, introduces some weaker or ambiguous issues related to the transparency of the program and the ability of the public to provide input. As with other elements of the offset program, we recommend that Title V be harmonized with Title III to ensure equivalency. Section 506(c) also has different accreditation standards than the Part D program, creating unnecessary confusion.
- *Allow for aggregation of small projects.* One additional programmatic design issue in both Title V and Title III Part D is that there is no specified role for aggregation of smaller landowners or land parcels into larger projects. There is nothing explicitly preventing aggregation, but a short provision could be inserted in the methodology section of each program to require a rulemaking to address aggregation procedures.

***

For additional information, please contact:

Jeff Fiedler, *Senior Policy Advisor*
Climate and Forests
jfiedler@tnc.org
(720) 974-7078 (Phone)
(720) 209-8852 (Mobile)

Eric Haxthausen, *Director*
U.S. Climate Policy
ehaxthausen@tnc.org
(703) 841-7439 (Phone)
(202) 550-3343 (Mobile)

July 28, 2009

The Honorable Tom Harkin, Chairman
Committee on Agriculture
U.S. Senate
Washington, D.C. 20510

The Honorable Saxby Chambliss,
Ranking Member
Committee on Agriculture
U.S. Senate
Washington, D.C. 20510

The Honorable Barbara Boxer, Chairman
Committee on Environment and Public Works
U.S. Senate
Washington, D.C. 20510

The Honorable James Inhofe,
Ranking Member
Committee on Environment and Public Works
U.S. Senate
Washington, D.C. 20510

Dear Chairmen and Ranking Members:

As the Senate considers climate change legislation, we urge you to establish a robust emissions offsets program with the US Department of Agriculture as the principal agency responsible for the development and implementation of agricultural and forestry offsets projects. The Agriculture and Forestry offsets provisions in recently passed American Clean Energy and Security Act (H.R. 2454) identify USDA as the lead federal agency responsible for overseeing the development and implementation of these projects. We recommend that a similar provision be adopted in Senate legislation as well.

Climate change policy should fully recognize the potential contributions of the forestry sector and utilize the full suite of benefits provided by working forests and harvested wood products to sequester and store greenhouse gases and reduce the nation's overall greenhouse gas footprint. Over the course of several decades, forest owners and manufacturers have worked with USDA to exchange information and expertise on private forest management and forest products. As a result, USDA has unique and specialized experience and expertise necessary to develop the methodologies and processes for appropriately crediting offset projects in the agriculture and forestry sectors.

Congress recognized such a role for the USDA in last year's Farm Bill. Similar to Section 2709 of the Food, Conservation, and Energy Act of 2008, climate change legislation should place responsibility on USDA to establish technical guidelines and regulations to assess offsets from forest projects, including establishing project protocols, certifying and verifying specific projects, and considering additional forestry projects beyond those specified in legislation.

We recognize as well that the Environmental Protection Agency has a critical role to play in implementing climate change policy as a whole, including the development of offset programs for certain projects outside the domestic forestry and agriculture sectors. Combined, the two agencies can leverage their respective expertise to produce an effective and efficiently implemented offsets program that will achieve further sequestration of atmospheric carbon while containing costs for consumers and energy producers.

We look forward to working with you on a final policy that achieves these important objectives.

Sincerely,

American Forest Foundation
American Forest & Paper Association (AF&PA)
American Forest Resource Council
Binational Softwood Lumber Council
California Forestry Association
Empire State Forest Products Association
Hardwood Federation
Intermountain Forest Association
Minnesota Forest Industries
Minnesota Timber Producers Association
National Alliance of Forest Owners
National Woodland Owners Association
Oregon Forest Industries Council
Plum Creek
Society of American Foresters
Washington Forest Protection Association
Weyerhaeuser Company

QUESTIONS AND ANSWERS

JULY 22, 2009

U.S. Senate Committee on Agriculture, Nutrition, and Forestry
The Role of Agriculture and Forestry in Global Warming Legislation
Questions for the Record
Secretary Vilsack
July 22, 2009

Chairman Tom Harkin

1. What can USDA do to assist producers in reducing their greenhouse gas emissions and increasing carbon sequestration? How can existing conservation programs be used, improved and better focused on this critical environmental priority?

Response: USDA, through its field-based workforce, technical tools, and assistance programs, is prepared to assist farmers and ranchers as they seek to reduce their greenhouse gas emissions and sequester carbon.

Many of the conservation and energy practices for soil and water protection with which USDA currently assists producers also reduce greenhouse gas emissions and sequester carbon. A whole-farm systems approach rooted in conservation planning and technical assistance and provided by conservation professionals provides an effective way to enact change and improve the environment.

The following are some examples of the types of actions that can be supported through USDA Conservation Programs that have greenhouse gas benefits:

- Energy audits: help producers assess their current on-farm energy use and recommend ways to reduce energy use
- Conversion or maintenance of no-till production: encouraged as a method to reduce fuel use and sequester carbon
- Methane digesters: for on-farm electricity generation and production to the grid
- Covered waste storage treatment structures: can be used to convert methane to CO2
- Nutrient management: to more efficiently apply fertilizer, reduce fuel consumption, and use less commercial fertilizer.
- Use of cover crops
- Improved management on existing pasture and forage-based farming operations
- Buffers (filter strips replacing crops along streams and other water sources and field borders) and replacing end-rows
- Planting trees

Examples of existing USDA programs:

Conservation Technical Assistance (CTA): Provides for USDA employees to work directly with landowners to develop and implement conservation plans. Also serves informational, outreach, and educational functions with regard to GHG emissions reductions and carbon sequestration.

Environmental Quality Incentives Program (EQIP): Financial and technical assistance for practice establishment and multi-year maintenance payments (no-till, tree planting, cover crops, forage establishment, improved grazing methods, etc.).

Conservation Innovation Grants (CIG): Increased emphasis for projects to include or focus on reductions in GHG emissions.

Conservation Reserve Program (CRP): A voluntary program that encourages farmers to convert highly erodible cropland or other environmentally sensitive acreage to long-term vegetative cover, such as tame or native grasses, wildlife plantings, trees, filter strips, or riparian buffers. In return, participants receive annual rental payments and cost-share assistance. There has been an increased emphasis on trees (increased cost-share percentage for practices that include trees, additional maintenance cost incentives for the first two to three years).

Conservation Reserve Enhancement Program (CREP): A federal-state natural resource conservation program administered under CRP guidelines that works to meet state environmental objectives in protecting environmentally sensitive land. The objectives of the CRP and CREP are to reduce soil erosion, protect the nation's ability to produce food and fiber, reduce sedimentation in streams and lakes, improve water quality, establish wildlife habitat, and enhance forest and wetland resources.

Wildlife Habitat Incentives Program (WHIP): Increased emphasis on trees (increased cost-share percentage for practices that include trees, additional maintenance cost incentives for the first two to three years).

Conservation Stewardship Program (CSP): Use the entire suite of energy enhancements offered in the old Conservation Security Program and the new Conservation Stewardship Program. Increased emphasis on trees (increased incentives for practices that include trees, and additional maintenance cost incentives for the first two to three years).

Healthy Forest Reserve Program (HFRP): Increase producer awareness and technical assistance.

Section 9006 renewable energy programs: These programs have funded improvements in energy efficiency and renewable energy systems to reduce CO2 emissions associated with purchased energy generated from fossil fuels. Renewable energy systems – such as wind, solar, geothermal, and anaerobic digester systems – also have the potential to supply green energy to the power grid, thereby replacing fossil fuel generated electricity. In some circumstances, installation of anaerobic digesters can reduce methane emissions associated with livestock waste management.

2. In fact, aren't the projected cost increases for American farmers from cap and trade under the USDA analysis you just summarized much less severe than the cost increases that farmers have faced in the last few years?

Response: We estimate that fertilizer and lime expenditures increased by 33 percent from 2006 to 2007 and an additional 27 percent from 2007 to 2008. Similarly, the fuels and oil expenditures increased by 22 and 18 percent and electricity expenditures increased by 13 and 6 percent over the same two years. These cost increases were driven by a more than doubling of fertilizer prices and a 45 percent increase in diesel prices over those same two years. Estimates of future price impacts from HR 2454 are less than the recent price increases stated above. For example, EPA estimates that natural gas prices will increase by 7 percent in 2015 to 31 percent by 2050. EPA also estimates that petroleum prices will increase by 3.2 percent in 2015 to 15 percent by 2015 and electricity prices will increase by 11 percent in 2015 to 35 percent by 2050.

3. We have been debating the role of federal policy in shifting native prairie and high quality grasslands to cropped land for some time now. In previous farm bills we have taken steps ensure that conservation programs do not provide unintended benefits for those who would convert grass to cropped land in order to enroll in conservation programs. Earlier this week, together with Chairman Peterson, I wrote to you about crop insurance rules as it pertains to this very subject. We may need to carry the same concern through to the climate bill, to ensure that nothing in the bill would inadvertently encourage landowners to convert grassland to cropland in order to qualify for crop-related carbon offsets for instance. There are many important public benefits, including carbon and climate benefits, from keeping grassland as grassland, especially in the case of native prairies. I would appreciate your views on this matter either now or as we continue to work on this bill in the coming weeks.

Response: We are aware of concerns about the potential effect of a carbon offset program on farmers' land use decisions. We believe that paying farmers for generating carbon offsets will actually provide a greater incentive for them to convert cropland into grassland than the other way around. Payments for carbon offsets generated from changing to no-till may provide some incentive for shifting grassland to cropland by increasing returns to crop production, but only if carbon lost from a change in land use is not accounted for. Other concerns that have been discussed focus on the incentives for the creation of an offsets program that would provide for farmers to 1) convert grassland to cropland prior to the implementation of the program in order to be eligible to generate offsets by converting the cropland back to grassland, or 2) convert cropland to grassland or trees and then converting existing grassland to cropland in order to continue producing crops.

This type of behavior on the part of landowners could be prevented through a properly designed offset program. One important feature to consider in putting together an offset program would be to require farmers to account for all of their fields when putting together a carbon offset project. This would prevent them from just shifting their production activities around on their fields to earn offsets without their activities leading to any net increase in sequestered carbon. Another feature to consider in designing the program would be the development of something like a carbon or offset base, similar to the crop base used for income support payments. By using historical land use and management practices to determine this base it would be relatively easy to use this base to disqualify from an offset program the conversion of cropland to grassland for land that had been in grassland until legislation was passed.

Finally, an increase in crop prices resulting from conversion of cropland to forest or grasslands by other producers would provide an incentive for other farmers to expand crop production onto grassland areas. This type of behavior would be limited by the features described above for producers participating in the offset program and the extent to which landowners participate in the offset program. Such "leakage" should be accounted for in the design of an offsets program so that landowners receive credit for the net decrease in carbon emissions attributable to their offset activities.

Ranking Member Saxby Chambliss

1. The USDA analysis estimates the "gross revenues associated with offsets" and yet tries to compare those to the costs incurred by farmers and ranchers. Will you please explain if the offset income noted in the long term analysis is for soil sequestration by row crop agriculture, or if as EPA notes, does the majority of the benefit go to afforestation?

Response: The offset information included in the USDA analysis was provided by the EPA. A majority of the estimated revenues earned by farmers and ranchers from offsets are associated with afforestation; other sources include soil carbon sequestration and methane and nitrous oxide emissions reductions. The presentation of aggregate offset supply within EPA's analysis masks the true offset potential of soil carbon sequestration on agricultural lands, which is substantial and a likely source of offset revenues for farmers. The actual agricultural soil carbon offset supply can be seen through detailed analysis. For example, EPA's analysis shows a 50 percent increase in the percent of cropland using conservation tillage and no-till by 2020 in response to a \$15/ton CO_2 incentive payment.[1] Because overall land area in crops declines slightly due to afforestation, the modeling indicates a net decrease in total agricultural soil carbon storage as carbon is transferred from the agricultural soils pool to the afforestation carbon pool.

We are working with the EPA to help ensure that the functions and assumptions used in modeling offsets are improved to better reflect potential impacts of the provisions in HR 2454.

2. Given the quick pace of the House's consideration and passage of the American Clean Energy and Security Act, I understand that there was not much time to think through the implementation aspects of the agricultural offset program. But now that USDA has had about a month to think about it, how do you envision the department would operate the offsets program? What agency or agencies would administer the program? How would the department interface with producers who want to participate? What sort of process would USDA establish to accredit aggregators and verifiers?

Response: The potential scale of a land-based offsets program is quite large, involving hundreds of thousands of farmers and landowners and millions of acres of land. USDA has a field-based infrastructure, with eyes and boots on the ground. We have technical expertise with the greenhouse gas sources and sinks from land systems and an understanding of agriculture and forestry. USDA has the technical capabilities to provide or oversee virtually all facets of either an incentive-based or offset-market system for greenhouse gases, including the determination of eligible practices; establishment of metrics for quantifying greenhouse gas benefits;

[1] EPA Analysis of the American Clean Energy and Security Act of 2009. www.epa.gov/climatechange/economics/economicanalyses.html

establishment of reporting requirements; technical assistance, including assisting in planning and implementation; certification; recording and recordkeeping, including ensuring against duplicate records; conducting audits and spot checks; awarding offsets; and monitoring against loss of carbon that is sequestered.

USDA has built extensive experience in implementing commodity and conservation programs in the farm sector. The infrastructure from specific USDA programs and systems could be either brought to bear to address GHG mitigation or could be used as a model for new activities.

USDA also recognizes that successful implementation of a carbon offsets program will require substantial regulatory work, including emissions tracking, compliance assistance, and enforcement activities to ensure that the full extent of atmospheric reductions are realized. USDA must work in full collaboration with other federal agencies, particularly EPA, in this important endeavor. EPA and USDA are aware of the work needed to move forward with offsets and other policies for the agriculture sector, and are currently working in these areas (e.g., protocol development, baselines, additionality, leakage and permanence options etc.) We believe we can work together seamlessly to implement a robust offsets program of the highest quality.

3. The 2008 farm bill, which was signed into law more than one year ago, directed USDA to establish technical guidelines to measure the environmental services benefits from conservation and land management activities in order to facilitate the participation of farmers, ranchers and forest landowners in emerging environmental services markets. It further directed USDA to give priority to the establishment of guidelines related to carbon markets.

What standards have been established? What process is the department using to establish these standards? The farm bill directed USDA to consult with other federal agencies, farm, ranch and forestry producers, the land-grant universities, and others interested in topic. Is this consultation occurring? When will standards be established?

Response: In 2006, USDA's Climate Change Program Office released guidance to farm and forest landowners to allow them to estimate their greenhouse gas footprints. This work relied on the support of the research and program agencies across the Department. We continue work on this front and are developing user-friendly tools that can help farmers and landowners make these calculations. The Department of Energy adopted USDA's technical greenhouse gas methods for use in their 1605(b) Voluntary Greenhouse Gas Reporting Registry.

The CarbOn Management Evaluation Tool (COMET-VR) was released to coordinate with the Department of Energy's 1605(b) guidelines. COMET-VR is a web-based decision support calculation tool that delivers estimates of annual soil carbon fluxes and fuel and fertilizer use, which can be reported to the 1605(b) voluntary greenhouse gas reporting system, and reports the effectiveness of adopting land management changes in sequestering soil carbon. Producers input their current and alternative farming and grazing practices into COMET-VR, which then estimates changes in fuel and fertilizer use and carbon storage from each alternative. This enables users to estimate changes in soil carbon storage from agricultural management history on

cultivated lands for most regions and cropping systems prevalent in the United States which helps farmers and ranchers make well-informed management decisions. Currently, COMET-VR contains the most common crop rotations at the Major Land Resource Area (MLRA) level, determined from the National Resource Inventory (NRI) and other national databases. However, not all possible crop rotations can be included in the model. Work is ongoing to include more perennial and horticultural crops as well as vegetable cropping systems.

The Forest Service has developed several options for estimating and reporting carbon stocks and fluxes from afforestation practices. Standard look-up tables provide estimates of average carbon stocks and fluxes for every major forest type by region and are adequate for most purposes.

In addition, the Forest Service has developed computer models that can provide more detailed estimates. These tools include the COLE model and the Forest Vegetation Simulator (FVS). Finally, USDA published guidelines for conducting site measurements and sampling to determine carbon stocks and fluxes at a highly detailed level and for stands with trees of multiple ages.

Looking forward, we envision a process to continue to broaden and refine the guidelines. We plan to engage other agencies and departments, the public and the technical experts, including those at land-grant universities at every step to ensure that the most recent information is included and that there is high confidence in the emissions reductions produced through agricultural and forestry offsets.

In general, we are contemplating developing stand-alone methods that are designed to: 1) quantify the emissions and sinks associated with specific source categories; 2) quantify emission reductions and carbon sequestration from conservation and land management practices and technologies; 3) support the development of entity and farm-scale greenhouse gas inventories; 4) develop prototype reporting systems and 5) ensure compatibility with any new federal incentive-based or offset-based greenhouse gas reduction system to the extent possible.

The products will initially be made available for use in public and private registries and reporting systems. The products will also be used by the Department in assessing the performance of conservation and renewable energy programs. Finally, the guidelines and tools will be prepared to facilitate their adoption and use in a federal regulatory greenhouse gas offsets market.

Senator Patrick Leahy

There should be no doubt in any of our minds that agricultural and forestry have a great opportunity to play an important role in efforts to reduce global warming. In fact, some farms and forestry operations are already leading the way to reduce their carbon footprint and have a phenomenal story to tell, while also contributing financially to their businesses. For example, when Norm Audet started farming back in 1965 with 30 cows in Bridport, Vermont, he never imagined that his Blue Spruce Farm would someday help to power the green mountain state. Today, Norm's three sons: Earnest, Earl, and Eugene run the family farm that not only produces 24 million pounds of fresh, delicious milk a year, but also 1.3

million kilowatt hours of clean, renewable energy in the Central Vermont Public Service Cow Power Program—enough to power roughly 200 Vermont homes annually.

By trapping their farm's methane, Blue Spruce Farm is able to provide the residents of Vermont with clean green cow power. I am thrilled to see the Audets, and other Vermont farmers like them, leading the way to show the potential for changing the way Vermont dairy farms, and farms across the country, can do business while helping the environment.

However, our farmers could do a lot more if we had a legitimate market for ag offsets in place today. With a properly functioning cap and trade system, more of our nation's farmers could find ways for their manure management, grazing, and sustainable forestry practices to generate additional revenue for their operations.

1. I hear from countless Vermont farmers like the Audets who are changing the way Vermont dairy farms do business, some with methane digesters and others who are changing their grazing rotations and feed rations to reduce the methane their cows produce. These environmental practices are smart business decisions for these farmers that bring in additional revenue and help their bottom line. Can you please tell me how a viable carbon offsets market would change farming in Vermont? How many more methane digesters do you think we could expect to see installed in the state? Moreover, what sort of payments would our farmers possibly see for their offsets and practices?

Response: A viable carbon offsets market would provide an economic incentive to farmers to install practices and adopt technologies that decrease atmospheric carbon buildup. It would also add another potential profit center to the farming operation, in addition to those associated with the sale of milk, cattle and calves, and energy from the manure digester operation. Any addition to the profit picture for dairies or any other animal operation can help the operation stay in business. The Vermont dairy industry is characterized by relatively small operations – fewer than five percent of operations have more than 500 cows – that may be operating at a higher cost than operations in other areas of the U.S., so this additional profit center could be important to the sustainability of Vermont's dairy industry.

The number of additional methane digesters that could be installed in Vermont is very difficult to estimate. This estimate depends on relative energy price, the state and national energy infrastructure, the ease with which farms can be joined to the energy grid, the cost and profitability of the digester, and the relative price that farmers will receive for their electricity. Vermont is a "net meter" state, which allows net metering for anaerobic digesters on dairy farms. This, in itself, provides an incentive for methane digesters that many other states do not currently enjoy.

At the present time there are a number of federal incentives for methane digesters. The Treasury Department recently announced (July 2009), under Section 1603 of the American Recovery and Reinvestment Tax Act of 2009, incentives up to 30 percent of cost for energy technologies such as methane digesters. The USDA Rural Development agency can assist farmers through loans and grants with implementation of methane digesters. Finally, USDA's Natural Resources Conservation Service (NRCS) can make technical assistance available through its EQIP program

for anaerobic digester design and installation where there is an associated water quality improvement.

The sort of payments farmers would see for their offsets and practices is also difficult to estimate. The aforementioned incentive from the Department of Treasury is 30 percent. Digester technology through the NRCS EQIP program can be cost-shared up to 75 percent for regular producers, and up to 90 percent for beginning and socially disadvantaged farmers and ranchers. Credit prices for greenhouse gas offsets will be set by the marketplace for carbon allowances.

From 2003 to 2008, USDA Rural Development provided grants and loan guarantees, through Section 9006 Renewable Energy Systems and Energy Efficiency Improvements Program, to fund ten anaerobic digester projects in Vermont amounting to $8.7 million in total project costs. These projects will generate an estimated 21.9 million kWh of renewable energy per year while reducing emissions of carbon dioxide by an estimated 15.7 thousand metric tons of CO_2 and emissions of methane by an estimated 47 thousand metric tons of CO_2e.

For 2009, the USDA Rural Development state office in Vermont has received three applications for anaerobic digester projects amounting to $5.2 million in total project costs, to be funded through the Section 9007 Rural Energy for America Program. These projects will generate an estimated 13 million kWh of renewable energy per year while reducing emissions of carbon dioxide by an estimated 10.2 thousand metric tons of CO_2 and emissions of methane by 14.2 metric tons of CO_2e.

With respect to GHG pricing and payments, we note that in EPA's analysis of HR 2454 indicates an offset price of $13/ton of CO_2e in 2015 and $27/ton of CO_2e in 2030. Such prices would establish average annual payments to Vermont's anaerobic digester projects (generating about 2,000 metric tons of CO_2e each on average) that range from $26,000 to $54,000 per year in additional income for better stewardship practices.

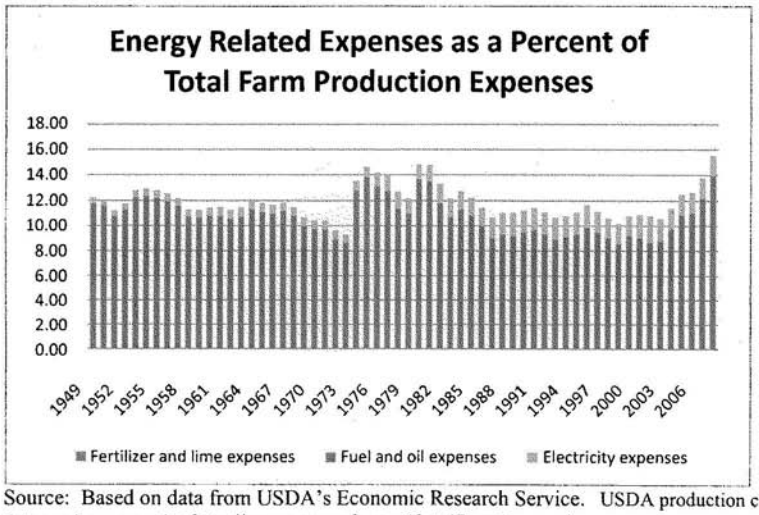
2. I worry about how we can help protect our working lands and open space for future generations. That is why I created the Farmland Protection Program, Forest Legacy, and more recently the Community Forest and Open Space Program to help protect our working farms and forests. With these difficult economic times, many landowners are under constant pressure to sell their land and move onto other things. Could you share with me how the financial incentives for offsets would impact farmers' and forestland owners' ability to stay on their land and to pass that land on to future generations?

Response: Offsets would provide additional revenue for farming and forestry activities. In many cases that land will continue to be used for production but will undergo changes in management practices. For some lands, the payments received from generating offsets may be sufficient on their own to keep land from converting to other uses. In areas where land competition is high, the payments provided by offsets may likely not be enough by themselves to keep land from being converted to non-agriculture uses. The payments from offsets may be sufficient, however, when combined with earnings from the primary production activity to keep

the land in agricultural uses when landowners have an interest in continuing their farming operation or maintaining farmland for future generations.

As I have read USDA's cost analysis of climate change legislation it does not take into account the mitigating factors like advances in technology or changes in farmers' production practices. Yet in the real world, precision agriculture and other new technologies combined with innovative management approaches are currently allowing many producers to increase efficiency and reduce input costs while maintaining yields. Do you expect that progress in innovation to continue? If so, how would that adjust your analysis and figures to take that innovation and adjustments into account? In addition, is there a way to ensure that these considerations are fully incorporated into future analyses USDA intends to do? By not out considering innovation by farmers, ranchers and private forest landowners, your cost estimate is likely to be an overestimate of what the cost will probably be in the real world?

Response: Our estimates do take some advances in technology into consideration. We assume that the share of energy-related expenses (fuels, fertilizer, and electricity) remain a constant share of total farm production expenses into the future. This assumption is consistent with the historical data that shows that while energy efficiency has improved significantly over time, the share of energy-related expenses relative to total farm production expenses has remained relatively stable (see figure below).



Source: Based on data from USDA's Economic Research Service. USDA production cost data can be accessed at http://www.ers.usda.gov/data/FarmIncome/

We do not take into consideration how changes in energy prices under HR 2454 may induce further technological advances. These induced technological innovations would mitigate the economic impact of HR2454. However, estimating advances in technology due to changing energy prices is difficult. Therefore, we view our estimated impacts as conservative.

The EPA's June 2009 analysis does take into account technological improvement as well as behavior responses of producers to higher carbon prices.

3. Incredibly there are still some who discredit the science of climate change and the need for action. Some economists have said that the cost of climate change, if we do nothing to stop it, will be far more significant to producers than the cost of climate policy. Would you agree with that? And in your opinion what are some of the harmful impacts and possible costs to American agriculture and forestry if we do not act soon to reduce our greenhouse gas emissions in this country?

Response: A report of the U.S. Global Change Research Program released in May 2008 provides a thorough assessment of the effects of climate change on agriculture, land resources, water resources, and biodiversity. It provides a comprehensive overview of the expected effects of climate change on natural and managed systems.

One component of climate change is the increased variability of both temperature and precipitation. There is an increased probability of more extreme temperatures during the summer, which would create a heat stress situation in plants, especially during the flowering stage. Warmer temperatures can cause plants to grow more quickly, but not necessarily bigger. Increases in nighttime temperatures are especially significant and affect grain and fruit development, quality, and productivity. In the northeastern United States, warmer temperatures will allow for a longer growing season for many crops. However, early or late season freezes or frosts are still possible, and plants that start to grow or flower earlier could be damaged early in the growing season. Fewer days of frost in some parts of the country may challenge crops that require freezing in order to bloom, such as plums and almonds. Survival of pollen is sensitive to high temperatures and extreme heat events at this critical stage, even for only a few hours, could reduce grain or fruit production. The direct impacts of climate change will vary by plant species.

Extreme temperatures would affect animals as much as plants. Animals maintain a constant core temperature and, when subjected to extremes of either hot or cold, change their metabolism to regulate their temperature. Extreme heat causes animals to reduce their feed intake, increase their water intake, and reduce their metabolism to maintain healthy body temperatures. For meat or dairy animals, these sudden temperature changes reduce productivity and sometimes cause mortality. Pregnancy rates decrease at higher temperatures. Warmer winters will reduce mortality from freezing and reduce demand for winter forage reserves. The effects of temperature on animal production are significant, particularly when the extreme events occur and animals do not have adequate shelter.

Precipitation changes across northeastern United States are projected to increase and include more heavy downpours and large precipitation events. These changes are projected to occur in the winter and spring; however, summer precipitation is expected to decrease. Northeastern

agriculture relies on storage of soil water to directly supply plant needs and provide summer irrigation. Increased heavy precipitation in spring could cause increased erosion on soils where adequate conservation practices are not in place. This may also create problems for field operations, creating difficulties in accessing and traversing fields for planting. Warmer temperatures cause the plants to use more water, which means more precipitation is needed to provide adequate moisture for plant growth. Decreased summer precipitation will create situations whereby plant production is reduced because of short-term drought.

Additional indirect climate change effects on plants and animals may be as large as the direct impacts described above. Indirect impacts include increased disease prevalence, insect infestations, and weed pressures. There will be expanded ranges for insects and increased potential for overwintering of insects and diseases because of the warmer temperatures, which allows them to extend their ranges more rapidly. Weeds are expected to move northward, expand in range, grow more rapidly as a result of the increased concentrations of atmospheric carbon dioxide, and become less susceptible to current methods of herbicidal control.

Producers will need to be aware of, and respond to, both the direct and indirect impacts of climate change on plants and animals to ensure production of a high quality food supply. Changes in yields resulting from climate change will have a direct economic impact on both producers and consumers. The cost of production, processing, storage and transportation are also expected to increase as agriculture responds to increasing threats to production from insects, weeds and pathogens.

Adapting agriculture to these changes will require the development of new farm, ranch and animal production, processing, storage and transportation technologies, new crop and animal varieties that can thrive under these stresses, and new soil, water and air conservation practices that will ensure sustainable ecosystem services. Herbicide effectiveness has been shown to decrease when used on weeds grown under elevated atmospheric carbon dioxide, and thus greater amounts of existing formulations or completely new agrochemicals will be needed that are potent, and yet still environmentally friendly. While increased atmospheric carbon dioxide has been shown to foster greater vegetative biomass production for plants such as those needed for livestock on rangelands, nutrient deficiency can also occur, thus raising the possibility of the need for supplemental nutrients to the plants or directly to the animals.

Senator Blanche Lincoln

1. The House bill passage has already had an effect on business, which is booming for the Climate Action Reserve, but declining for every other registry because speculators are turning towards California. This lack of competition is not good for Arkansas, and it's not good for other Southern and Midwestern states that use different methodologies that could have a huge impact on offsetting carbon in the early years that California alone won't. For a carbon market to function, you need to have more than one player.

The way the language was written, only one program technically meets the requirements for early action on offsets. Clarification in the language is needed to determine what

Congressional intent was. (Was it the intent to recognize public benefit corporations, such as Winrock?).

Response: We believe that the intent of the House regarding this provision could be best addressed by requesting additional information from the House Energy and Commerce Committee.

2. I am proud that Arkansas is home to Winrock International, who created the first voluntary greenhouse gas registry in the U.S. in 2008, and is the most widely used voluntary carbon market registry in the world. The American Carbon Registry has over a decade of operational experience and has set the bar for transparency and integrity that is the market standard today.

Based on current language in (Section 740 of) the Waxman-Markey bill, however, it does not provide clarity to the market on qualification for early action. And the American Carbon Registry and other voluntary offset programs have seen a rapid shift in business to the California Climate Action Reserve, whose registry business is now booming. This is not to the benefit of the market since one program alone will not be able to supply sufficient offsets in the next 3-5 years to help achieve the intended cost reduction goals that offsets can provide.

The California Climate Action Reserve has issued only over one million tons, which is not enough to make a dent in cost of compliance. In comparison, the American Carbon Registry has issued over 30 million tons. In order to reduce the cost of compliance and accomplish hundreds of tons of real emissions reductions in the years leading up to regulation, multiple early action programs must be clearly recognized. In addition, one early action program will not be able to develop all of the new standards for important agriculture and oil and gas industry offsets that are important to agricultural and oil producing states. I believe the American Carbon Registry has shown it's committed to developing high quality, cutting edge standards for these sectors.

Is it the intent of the Administration to reward early action and recognize multiple, government and public benefit early action programs, such as Winrock's non-profit American Carbon Registry, that hold high environmental standards for offset projects?

Response: As drafted, Section 740 of HR 2454 gives the EPA Administrator responsibility for administering early offset supply for offset projects initiated after January 1, 2001, and specifies a set of criteria for qualifying registries and protocols. Early offset credits issued under a state or tribal law or regulation or through a registry that is at least of equal stringency to the criteria and methodologies of the programs established under State or tribal law or regulation would be considered by the Administrator. Our understanding of this provision is that it would establish the rules developed under state or tribal law or regulation as the effective minimum standard. Offset projects reported under other registries would only be eligible if these other registries are found to be at least as stringent as the State and tribal registries approved by the EPA Administrator. To our knowledge, EPA has not evaluated existing state, tribal or voluntary offset programs and registries against the criteria outlined in Section 740 of HR 2454 and has not

made determinations of potential eligibility of projects or effective stringency of measurement and reporting rules.

Section 504 (a)(2)(B) outlines additionality requirements to be used by the Secretary of Agriculture for agricultural and forestry offsets. These provisions provide exceptions for activities that meet the requirements of Section 740 and allow for early crediting of activities that are readily reversible. Reversible activities include measures that sequester carbon in soils and plants, which could release stored carbon if management practices change. Under the provisions, readily reversible activities are not required to be registered under a regulatory or voluntary registry. For activities that are readily reversible, the Secretary may set an alternative earlier date to begin crediting offsets, not earlier than January 1, 2001. In determining whether to set an alternative date, the Secretary will need to determine that setting such an alternative date may produce an environmental benefit by removing an incentive to cease and then reinitiate activities that began prior to January 1, 2009. The goal of this provision is to improve the environmental performance of the offset provision by removing incentives to reduce existing carbon stocks.

The intent of the Administration is to support forward-looking energy legislation that spurs U.S. development of advanced, clean energy technologies to reduce our dependence on oil, strengthen our energy and national security, create new jobs all across America, and help prevent the worst consequences of climate change. Key underlying issues to balance include: attempting to treat all farmers consistently and fairly; ensuring that early adopters are not put at a disadvantage relative to their neighbors and other farmers; and ensuring that overall environmental objectives are met.

Senator Sherrod Brown

1. Confronting global climate change will present opportunities and challenges for my state's two most significant industries: agriculture and manufacturing. Of these, minimizing costs and maintaining global competitiveness are of the utmost importance. In particular, I have been focused on providing rebates to energy-intensive and trade exposed industries. These rebates would fully compensate energy-intensive manufacturers, including nitrogen fertilizer, for any direct and indirect costs related to the bill until 2025. Does your economic analysis include this rebate for nitrogen fertilizer? How does this rebate to nitrogen fertilizer producers affect the cost to farmers?

Response: While most of the direct energy price increases would be felt immediately by the agricultural sector, fertilizer costs would likely be unaffected until at least 2025 due to provisions in HR 2454 that would distribute specific quantities of emissions allowances to energy-intensive, trade exposed entities (EITE). In absence of the EITE provisions, higher fertilizer prices could lead to an average annual increase in crop production expenses of $1.4 billion in real 2005 dollars over 2012-18.

Senator Pat Roberts

1. Your testimony states:

The removal of cropland and pastureland for afforestation would place upward pressure on crop prices, benefitting producers of livestock feed but leading to higher livestock input costs and higher producer prices for livestock and milk. We have yet integrated these factors into our estimates of changes in net farm income.

Why was the department unable to include these impacts on the livestock industry and food prices? When will the department update their net farm income estimation with these factors included?

Response: Our preliminary analysis did present the impacts on livestock prices due to higher energy prices in the short-term. However, the impacts on livestock prices were negligible because the impact of HR 2454 was small in the short-term. We were unable to assess the impact of the removal of cropland and pastureland for afforestation because we did not have detailed information on the location and type of land that would be converted.

2. Table 8 of USDA's "A Preliminary Analysis of the Effects of HR 2454 on U.S. Agriculture" combines the estimated gross revenues from offsets for afforestation and soil carbon. What are the individual gross revenue estimates for those activities?

Response: All of the estimated gross revenues in Table 8 were due to afforestation. However, the assumptions used by EPA in their modeling are not entirely consistent with HR 2454. For example, in EPA's analysis, the percentage of acreage using reduced tillage increases under HR 2454, total carbon sequestration in cropland does not increase because the amount land under crop cultivation declines. Under HR 2454, those farmers that adopt reduce tillage methods will earn credits, regardless of broader trends in the sector. We are working with the EPA to help ensure that the assumptions used in modeling offsets are consistent with the provisions in HR 2454.

Table 8--Estimated Gross Revenues from Offsets Associated with HR 2454 (in billion 2005 $)

Item	Near term	Medium term	Long term
Afforestation and Soil Carbon	0.4	3.6	17.7
Methane and Nitrous Oxide Reductions	0.1	0.5	2.5
Forest Management	1.6	3.4	8.2
Total Offset	2.1	7.6	28.4

Senator Mike Johanns

1. In previous testimony to the Senate Environment and Public Works Committee, USDA has stated: "carbon offset credits must not be awarded for actions that would have happened in the absence of the offsets policy."

If a farmer owns highly-erodible land, and he is signed up for a farm program, that farmer is required to develop and implement a conservation plan in order to get his payment. And these farmers are likely to be required to no-till their crops as part of their conservation plan. By no-tilling, this farmer is sequestering carbon. However, this activity has been happening for years and is driven by farm bill requirements for farm payments, not a new "offsets policy." So based on USDAs apparent support for "additionality," would this person qualify to accrue carbon credit payments?

Response: Under Title V of HR 2454, to receive offset credits, a producer's actions must be new and additional. While conservation tillage and no-till are practiced widely across the U.S., to provide greenhouse gas benefits, farmers must practice no-till or reduced tillage on a continuous basis and must make these changes permanently. Most no-till and reduced tillage in this country is performed intermittently. Farmers will practice no-till for a particular crop or for a period but will periodically till the soil. Even in cases where no-till is practices continuously, farmers are not making commitments to continue these practices indefinitely. Provisions of HR 2454 require that losses of carbon be accounted for, creating new obligations and responsibilities for farmers who decide to pursue soil carbon offset credits.

A precise definition of additionality will need to be developed either in the statute or in the rules and regulations. At this stage, decisions regarding whether the application of intermittent conservation and no-till practices constitutes an existing practice have not been made. Furthermore, decisions regarding whether a decision to apply a practice permanently would constitute a new and additional practice have not been made.

Under a different scenario: If farmers have participated in a program like EQIP, they received cost-share payments for implementing conservation practices on their property. For example, maybe they installed a methane digester. These practices all sequester carbon. But the practice was implemented in the past and USDA already paid for it. Is that person eligible for carbon credit payments under your support for additionality?

Response: Any rules regarding the functioning of the program would need to be developed consistent with the provisions of the final statute, and under a full and open process that includes opportunity for public input and comment. At this point, it is premature to expound on the eligibility of specific actions or scenarios. As a general matter, Sections 740 and 504 of HR 2454 address the eligibility of actions taken prior to January 1, 2009.

2. The President's budget initially suggested farm payments would be replaced by payments for sequestration – or carbon credits. More recently, USDA has suggested that these so-called "sequestration payments" will offset the increases in input costs resulting from this bill.

My question is, which is it? Will the sequestration payments offset the cost increases or replace traditional farm program support?

Response: One of my top priorities as Secretary is to provide American farmers with a robust safety net that provides protection from market disruptions, weather disasters, pests and disease

that threaten the viability of American agriculture. The President's Budget proposes to maintain the three-legged stool of farm payments, crop insurance, and disaster assistance. In keeping with the President's pledge to target farm payments, the President's 2010 budget proposes a hard cap on all program payments at $250,000 and to phase out direct payments to the largest producers.

We all need to pitch in to support the President's goal to cut the deficit in half. Our nation depends on a safe and abundant food supply, and I will work diligently to promote policies that support the farmers and ranchers we all depend on.

The Department must also create real and meaningful opportunities for farmers and ranchers to succeed. We can do this through some of the actions I have already discussed and through other actions, including supporting independent producers and local and organic agriculture, and enforcing the Packers and Stockyards Act. At the same time, the budget recognizes that we can help transition farmers to earn income from market-based environmental services, such as carbon credits.

USDA believes that the agriculture and forestry sectors hold the potential to deliver substantial emissions reductions, including carbon sequestration, under a national climate change policy. As a result of this potential, new economic opportunities may be created for farmers and foresters. This vision is shared with a wide variety of renewable energy, conservation, and agricultural organizations.

At my direction, USDA will support the federal government in developing markets that reward producers for sequestering carbon and limiting greenhouse gas emissions. Through the authority provided under the 2008 Farm Bill, USDA will help by developing metrics and certifications associated with the environmental services of conservation and certain land management activities to facilitate the participation of farmers, ranchers, and forest landowners in the emerging environmental services markets. USDA will also increase its research and analytical capabilities and conduct government-wide coordination activities to encourage the establishment of markets for these ecosystem services.

These ecosystem services markets, along with conservation and renewable energy programs, offer farmers and ranchers new sources of revenue that also create public benefits for all Americans, such as clean water, clean air, and wildlife habitat.

3. Does USDA have any evidence that suggests that adoption of the House-passed bill, without any additional international agreement, will change the average global temperature, or the amount of carbon in the atmosphere?

Response: USDA does not agree with the premise of this question. All other developed countries except the United States have ratified the Kyoto Protocol. These countries are negotiating new commitments that will extend beyond 2012. Climate change is a global issue that demands a global solution. The world is waiting for us to act, and without us it is hard to imagine a global result emerging from Copenhagen. We already know that if we act others will take action. For example the EU has said they will increase their emissions reductions from 20

percent to 30 percent, if we act, and other developed countries will also take on more robust targets.

We are pressing major emerging economies to take significant actions that are consistent with the science demands, but they will not agree to major reductions if the U.S. does not take robust action. So the critical first step must be to put our own house in order with a comprehensive, mandatory national program. We are working to craft a truly global agreement to address climate change by pushing forward on three related fronts: first, through the UN Framework Convention on Climate Change, second, through the Major Economies Forum with the world's 17 largest economies, and third, through high-level bilateral engagement with China, the world's largest emitter.

4. In your testimony on July 7, at the Environment and Public Works Committee, you noted that "fertilizer and fuel costs account for 50 to 60 percent of variable costs of production for corn."

a. Are those the only costs that will increase for corn growers?

Response HR 2454 will affect energy expenses directly for fuels and electricity and indirectly through higher costs for fertilizers, though fertilizer prices are not expected to rise in response to cap-and-trade until at least 2025, due to the allowance rebates provided to energy-intensive, trade-exposed industries.

b. Given the certainty of increased fuel and fertilizer prices under the House bill, by how much must corn producers increase their incomes to overcome the increases in fuel and fertilizer costs?

Response: In the short-term, we estimate the additional costs for fertilizers, fuels, and electricity will increase corn production costs by $1.19 (0.4 percent) per acre in real 2005 dollars. In the medium-term, the additional costs will add $12.02 (4.6 percent) per acre to corn production costs. In the long-term, the additional costs will add $25.19 (9.6 percent) per acre to corn production costs.

c. How does this number change if you add electricity costs? Does it go up or down?

Response: The cost increases presented in (b) include electricity costs.

d. **Will U.S. corn production go down under this bill? If so, by how much and how will that affect the price and availability of food, biofuels, and feed for livestock?**

Response: Corn production is only marginally affected, but our study is preliminary. We only assess the impact of higher energy prices on prices and

production. We do not take into consideration the effects of removing cropland in order to sequester carbon. We will include this as part of our final analysis.

5. The U.S. fertilizer industry has closed half of its domestic production in the last decade due to fuel switching or an increase in the demand of natural gas. The U.S. currently imports over half of its nitrogen needs. It is worth noting that since nitrogen is made from natural gas, the places that are picking up America's lost fertilizer industry - Russia, the Middle East, China, Venezuela - are those very places which have an abundance of oil and natural gas. The fertilizer industry has warned that further increases in the demand for natural gas caused by a cap and trade system will cause domestic production to decrease and more plants to close.

Do you agree that it is important to have some domestic production of such a critical input? We already import over 60 percent of the oil we use. Many of these countries are in unstable parts of the world that are unfriendly to the United States. Is this not a food security issue for the country to rely so heavily on foreign countries for our ag inputs? Doesn't it also cost America additional jobs?

Response: The production of fertilizer is energy intensive, and thus, potentially vulnerable to the problem of greenhouse gas leakage. To address this problem, HR 2454 would provide domestic producers in sectors such as fertilizer with allowances to compensate for increased costs brought about by the implementation of the bill (referred to in the bill as emissions allowance rebates). These rebates are provided through at least 2034, and while the size of the rebate may be gradually reduced starting in 2026, depending on the facts at the time, this compensation could continue unchanged after 2025. Because of this provision, we do not expect nitrogen fertilizer prices to be affected by the greenhouse gas cap in the near term. This provision was included in the Preliminary Analysis provided to the Senate Agriculture Committee on July 22, 2009.

We expect other countries to act to reduce their emissions, thus reducing the potential for domestic fertilizer producers being undercut on price in the long-term. Within the Administration, we are pressing major emerging economies to take significant actions that are consistent with what the science demands, but they will not agree to major reductions if the U.S. does not take robust action. So the critical first step must be to put our own house in order with a comprehensive, mandatory national program. We are working to craft a truly global agreement to address climate change by pushing forward on three related fronts: first, through the UN Framework Convention on Climate Change, second, through the Major Economies Forum, with the world's 17 largest economies, and third, through high-level bilateral engagement with China, the world's largest emitter.

6. On page 12 of your estimate, you note the near, medium, and long-term revenues from offsets associated with "Afforestation and Soil Carbon," "Methane and Nitrous Oxide Reductions," and "Forest Management" under H.R. 2454.

In the first line of that table, afforestation and soil carbon are in a combined category.

a. Of those gross revenues for afforestation and soil carbon, please explain how much accrue to farmers through tillage practices and how much accrue through afforestation.

Response: All of the estimated gross revenues in Table 8 were due to afforestation. However, the assumptions used by EPA in their modeling are not entirely consistent with HR 2454. For example, while the percentage of acreage using reduced tillage increases under HR 2454, total carbon sequestration remains unchanged because the amount land under crop cultivation declines. Under HR 2454, those farmers that adopt reduce tillage methods will earn credits. We are working with the EPA to ensure that the assumptions used in modeling offsets are consistent with the provisions in HR 2454.

A majority of the estimated revenues earned by farmers and ranchers from offsets are associated with afforestation; other sources include soil carbon sequestration and methane and nitrous oxide emissions reductions. The actual agricultural soil carbon offset supply, which is significant, can be seen through detailed analysis. For example, EPA's analysis shows a 50 percent increase in the percent of cropland using conservation tillage and no-till by 2020 in response to a $15/ton CO_2 incentive payment.[2] Because overall land area in crops declines slightly due to afforestation, the modeling indicates a net decrease in total agricultural soil carbon storage as carbon is transferred from the agricultural soils pool to the afforestation carbon pool. This masks the true offset potential of soil carbon sequestration on agricultural lands, which is substantial and a likely source of offset revenues for farmers.

b. In addition to revenue figures for each category, please provide the number of acres associated with tillage practices and, separately, the number of acres associated with afforestation.

Response: EPA combined the afforestation and soil carbon categories in the aggregated results in the latest analysis released on June 23, 2009. Separate acreage figures for tillage and afforestation were not used in the USDA analysis. EPA noted that because of how it is handled in the FASOM model (used by EPA for this analysis), agricultural soil sequestration does not show significant supply in the aggregated data. However, detailed results from the FASOM model indicates a 50 percent increase in the percent of cropland using conservation-tillage and no-till by 2020 in response to a $15/ton CO2 incentive payment. Because overall land area in crops declines due to afforestation, the modeling indicates a net decrease in total agricultural soil carbon storage as carbon is transferred from the agricultural soils pool to the afforestation carbon pool. This masks the true offset potential of soil carbon sequestration on agricultural lands, which is substantial and a likely source of offset revenues for farmers.

[2] EPA Analysis of the American Clean Energy and Security Act of 2009. www.epa.gov/climatechange/economics/economicanalyses.html

c. Are the figures in table #4 annual figures?

Response: The estimated changes in table 4 compare the average annual percentage changes in commodity prices relative to baseline prices from 2012 to 2018.

d. If so, please provide the figure for each year between and including 2012 and 2018.

Response: See attached tables 1 and 2.

e. Please provide the annual figures for each year in the "medium term" category, and the "long term" category.

Response: See attached tables 3, 4, 5, 6

7. Concerning figure 4 in your estimate shown on page 12, please provide an analysis of how the sequestration you show in that figure would affect cattle and calf operations across the country.

Response: Our preliminary analysis did present the impacts on livestock prices due to higher energy prices in the short-term. This analysis did not specifically assess the implications on cattle and calf operations. However, the impacts on livestock prices were negligible because the impact of HR 2454 was small in the short-term. We were unable to assess the impact of the removal of cropland and pastureland for afforestation because we did not have detailed information on the location and type of land that would be converted.

We are planning to complete a more comprehensive analysis which would include these land use change impacts.

8. State by state impact analysis: please identify the portions of the estimate that identify input cost increases and agriculture offset revenues on a state-by-state basis.

Response: Due to modeling limitations, we will not be able to provide a state-by-state assessment. However, we will provide a regional assessment in our final study.

9. Livestock and cattle producers: please identify - by percentage and total output in 2005 dollars - the value of U.S. agricultural productions not included in the estimate.

Response: The modeling of the livestock and cattle sector is fairly comprehensive. The only livestock and cattle commodities not modeled are aquaculture, sheep and goats, and horses. Based on the 2007 Census of Agriculture, these categories accounted for about 3 percent of the market value of total livestock sales.

10. Specialty crops: please identify - by percentage and total output in 2005 dollars - the value of U.S. agricultural productions not included in the estimate.

Response: The modeling of the crop sector is less comprehensive. We do not model vegetables and melons; fruit, tree nuts, and berries; nursery, greenhouse, and floriculture; and tobacco. Based on the 2007 Census of Agriculture, these categories accounted for 36 percent of the market value of total crop sales.

11. The estimate is identified as "preliminary." Will an additional or finalized estimate be completed? (OCE)

Response: We are continuing to work on the report and it will be finalized within the coming months.

12. Does USDA have any idea how it would implement a carbon credits program?

Response: The potential scale of a land-based offsets program is quite large, involving hundreds of thousands of farmers and landowners and millions of acres of land. USDA would work in collaboration with EPA, DOI, DOE, and other relevant Agencies to implement a greenhouse gas offsets program. USDA has a field-based infrastructure, with eyes and boots on the ground. We have technical expertise regarding the greenhouse gas sources and sinks from land systems, and an understanding of agriculture and forestry. USDA potentially has the technical capabilities to provide or oversee an incentive or offset-market system for greenhouse gases, including the determination of eligible practices; establishment of metrics for quantifying greenhouse gas benefits; establishment of reporting requirements; technical assistance, including assisting in planning and implementation; certification of implementation; providing a repository of reporting, recordkeeping, including ensuring against duplicate records; conducting audits and spot checks; awarding offsets; and monitoring against loss of carbon that is sequestered.

USDA has experience in implementing commodity and conservation programs in the farm sector and specific USDA programs and systems that could be either brought to bear to address GHG mitigation or that could be used as a model for new activities.

13. How would the amount of carbon sequestered be calculated?

Response: The rules for estimating and reporting greenhouse gas emission reductions and carbon sequestration from agricultural and forestry activities would need to be developed consistent with guidance provided by Congress. USDA has prepared technical greenhouse gas reporting guidelines that offer information that could be useful. In 2003, the Department of Energy requested technical support from USDA in preparing revised greenhouse gas reporting guidelines for use in the National Voluntary Greenhouse Gas Reporting Registry administered by DOE under Section 1605(b) of the 1992 Energy Policy Act. USDA prepared technical methods, modeling tools, and supporting documentation for all greenhouse gas sources and sinks in the agriculture and forestry sectors. These guidelines enable farmers and land owners to estimate, report, and register greenhouse gas reductions and carbon sequestration. USDA worked closely with the Department of Energy, EPA and other federal agencies and institutions in their preparation and release.

The 1605(b) guidelines include "state-of-the-science" guidance and tools for estimating emissions from agricultural, forestry, and conservation activities important for carbon sequestration efforts, as well as from other sources of greenhouse gases. Other provisions encourage participation in the program by small emitters of greenhouse gases, such as farmers and small businesses.

The guidelines offer farmers and ranchers an online tool for carbon calculation called COMET-VR, which provides a simple and reliable method for estimating soil carbon sequestration. The technical guidelines for forests include a series of detailed carbon stock default tables with guidance on applying the tables for inventory purposes, direct measurement protocols, and guidance on the use of models.

Actions that farmers and landowners can consider reporting include using no-till agriculture, installing an anaerobic digester, improving nutrient management, and managing forestland. The program provides opportunities for agriculture and forestry to partner with industry, in developing actions to reduce greenhouse gases by allowing them to document benefits of actions.

For more information on visit: http://www.usda.gov/oce/global_change/gg_reporting.htm

Looking forward, we envision a process to continue to broader and refine the guidelines. We plan to engage the public and the technical experts at every step to ensure that the most recent information is included and that there is high confidence in the emissions reductions produced through agricultural and forestry offsets.

In general, we are contemplating developing methods that are stand-alone and will be designed to: 1) quantify the emissions and sinks associated with specific source-categories; 2) quantify emission reductions and carbon sequestration from conservation and land management practices and technologies; 3) support the development of entity and farm-scale greenhouse gas inventories; 4) develop prototype reporting systems and 5) ensure compatibility with any new federal incentive-based or offset-based greenhouse gas reduction system to the extent possible.

The products will initially be made available for use in public and private registries and reporting systems. The products will also be used by the Department in assessing the performance of conservation and renewable energy programs. Finally, the guidelines and tools will be prepared to facilitate their adoption and use in a federal regulatory greenhouse gas offsets market.

14. Would it rely on self-reporting by companies and individuals?

Response: The rules governing reporting under an offsets program will be either specified in legislation or established during the rule making and could rely on self-reporting to the extent that companies and individuals submit their offsets for listing in a registry. Similar to their participation in other conservation and commodity programs, carbon offset participants could be required annually to certify compliance with the terms and conditions of their agreement to implement offset practices according to standards and specifications. HR 2454 requires the use of independent third-party verifiers, and under this legislation, the verifier would inspect the project and make sure that the practices being used are suitable for generating offsets, are in

place, and being implemented properly. The verifier would also ensure that an appropriate methodology was used to calculate the carbon offsets being generated by the project.

15. Does that leave the door open for fraud and abuse?

Response: No, HR 2454 requires audits. Like many other programs throughout the federal government, the carbon offset program could utilize a statistically significant, random spot check of participants.

The self-reporting process described above does leave open the possibility for some fraud and abuse. However, audits and verification are conducted on a regular basis, so we would expect fraud and abuse to be minimal. These audits could also be supplemented with satellite and aerial imagery which would enable the Department to verify producer records with respect to use of specific management practices.

16. USDA's estimate notes on page 4 that fertilizer costs would likely be unaffected until 2025 due to provisions in H.R. 2454 that distribute specific quantities of emission allowances to "energy-intensive, trade exposed entities." Footnote 4 on page 4 further specifies the source of the allowances identified in the estimate. Please provide an aggregate estimate of the total industry, based on the value of goods and services produced, that is eligible for these allowances. Please also provide an estimate of the number or specific portion of the total allowances made available by the program you identified that would be awarded to nitrogenous fertilizer manufacturing.

Response: The impact of the EITE on fertilizer producers was provided by EPA.

17. Do you have any analysis that shows increases in the costs of gasoline, diesel fuel, and electricity for Nebraska farmers?

Response: Modeling limitations do not allow us to estimate state-by-state impacts. We plan to provide a regional comparison in the final report. Table 7 may provide some insights into the effects on Nebraska farmers. The data in Table 7 is from the 2007 Census of Agriculture and compares the expenses incurred by Nebraska farmers as a percentage of total farm production expenses by the North American Industry Classification System (NAIC). The table shows that Nebraska farmers, in general, spend less on energy related expenses as a share of total farm production expenses compared to the United States.

18. Do you have any analysis that shows that these increased costs will be exceeded by other sources of income within my state?

Response: Modeling limitations do not allow us to estimate state-by-state impacts. However, we plan to provide a regional comparison in the final report.

19. Does the result of your analysis vary at all based on what crops a producer is growing?

Response: The type of crop production matters. For example, soybean producers will be less affected than corn producers because soybean production is less energy intensive.

20. Does it vary based on whether a grower uses irrigation?

Response: Our results are based on average expenditures by crop. Therefore, we do not differentiate by irrigation or dryland crop production.

21. What about an analysis of how the legislation will affect farmers and ranchers who produce cattle, dairy, pork, sheep, chicken, and turkey?

Response: We plan to present a more detailed discussion of the livestock sector in the final report.

22. What is the sequestration potential for an average acre of corn production?

Response: The greatest change in carbon sequestration rate would be realized in situations where a farmer is currently using conventional tillage and changes to no-till on continuous high productivity corn. The potential increase in carbon sequestration rate (the "delta" that would be tradable under a cap and trade system for corn) is 0.6 to 1.0 tons of carbon (in carbon dioxide equivalents) per acre per year. This projection is based on numerous scenarios that have been analyzed using the USDA Carbon Management Evaluation Tool for Voluntary Reporting (Comet-VR). Estimates of the increase in carbon sequestration due to tillage practices depend on climate and soils, as well as the depth of the soil profile, but would be representative in the Corn Belt and for irrigated corn in the high plains.

23. How much sequestration potential is available through modification of tillage practices?

Response: This depends on several factors, including the type of crops being grown, region of the country, soil type, rainfall, and the level of nutrient, pest, and water management. Carbon sequestration rates and the potential for increasing rates are extremely variable across the country. A reasonable estimate of the national overall average increase in carbon sequestration that would result from going from a conventional tillage regime to a no-till regime for a typical Midwest crop rotation is 0.25 tons of carbon (in carbon dioxide equivalents) per acre per year. If applied across all 400 million acres of cropland, this would provide an additional 100 million metric tons of carbon (in carbon dioxide equivalents) per year resulting from modifying tillage from conventional tillage to no-till. This estimate is based on extensive research and numerous scenarios that have been analyzed using the USDA Carbon Management Evaluation Tool for Voluntary Reporting (Comet-VR).

24. How many offsets does your analysis show are purchased by United States entities for meeting requirements under the caps imposed by the House bill?

Response: The USDA analysis relies on the broader economy-wide analysis of HR 2454 produced by EPA. USDA did not conduct a separate analysis of use of offsets in meeting the requirements under caps imposed by HR 2454.

25. What are the total non-U.S. offsets purchased?

Response: EPA reports the use of international offsets varies by time period in their core scenario. They also prepared a series of sensitivity analyses that utilized various assumptions.[3]

26. Does your analysis show the countries that are the recipients of this money?

Response: The USDA analysis relies on the broader economy-wide analysis of HR 2454 produced by EPA. USDA did not conduct a separate analysis of use of offsets in meeting the requirements under caps imposed by HR 2454.

27. Where does the income from cap-and-trade come from?

Response: The USDA analysis relies on the broader economy-wide analysis of HR 2454 produced by EPA. USDA did not conduct a separate analysis of use of offsets in meeting the requirements under caps imposed by HR 2454. In EPA's analysis, the source of income from the sale of offsets is from the purchasers of offset credits, who can reduce their costs of complying with the requirements of HR 2454 at lower cost by purchasing offsets than by reducing emissions within their operations.

Senator John Thune

1. Should carbon emissions from agriculture activities and value added agriculture activities be explicitly exempt from the declining carbon cap? Should these activities be exempt from regulation under the Clean Air Act?

Response: Provisions of HR 2454 Section 501(b) provide exemptions for the emissions of greenhouse gases from agricultural sources. Regarding the issue of addressing greenhouse gases through the Clean Air Act, EPA has proposed a finding that greenhouse gases contribute to air pollution that may endanger public health or welfare. It is important to note that this proposed finding does not include any proposed regulations. Before taking any steps to reduce greenhouse gases under the Clean Air Act, EPA would conduct an appropriate process and consider stakeholder input. Notwithstanding this required regulatory process, both President Obama and Administrator Jackson have repeatedly indicated their preference for comprehensive legislation to address this issue and create the framework for a clean energy economy.

2. What do you believe will be the most readily used agriculture offsets in the first 10 years of the Waxman-Markey climate change legislation? Planting trees? Planting grass? Changing farming practices?

Response: It is difficult to tell at this point exactly which offsets will be the most readily used. We believe that a number of offset technologies and practices show promise, including perennial grass and forages, continuous no-till production, tree planting, and manure digesters.

---

[3] EPA Analysis of the American Clean Energy and Security Act of 2009. www.epa.gov/climatechange/economics/economicanalyses.html

Ultimately, the choice to pursue an offset project will be made by the landowner and will take into account a number of factors, including financial returns. Allowing some form of compatible use that increases income would influence preferences and the subsequent amount of adoption. One example of a compatible use might be using grasses or other vegetation choices for seed or livestock feed.

While the carbon sequestration benefits are lower, perennial grass and forage establishment may be more acceptable to farmers than tree planting. Grass and forage establishment require the same implements that farmers use for small grain production, and many are already engaged in forage production. It is also relatively easy to use forage fields for other uses if change is desired.

Senator Charles E. Grassley

1. USDA's preliminary analysis of the Waxman-Markey Bill does not assume any increase in nitrogen fertilizer costs in the early years despite increases in the price of natural gas because it assumes those costs will be fully covered through allowances to "energy-intensive trade exposed industries." Given that the number of allowances in that pool is finite, but the number of eligible industries as well as how the allowances will be divvyed up between industries will not be determined until the program is implemented, how can the USDA rely on this assumption? Also, even if the EITE allowances do cover the additional direct compliance costs imposed on fertilizer production, how does USDA's analysis account for potentially significant increases in the price of natural gas due to fuel switching from coal to natural gas in the electricity sector?

Response: Our assumptions regarding the impact of natural gas prices on the fertilizer industry, with respect to the availability of allowances and the industries that would receive those allowances, are based on information provided by EPA. To highlight the importance of those allowances, we provided an estimate of the impacts on production costs with and without the allowances. In addition, we note that in the absence of the EITE provisions, net farm income would fall by an average of $1.3 billion annually over 2012-18 in real 2005 dollars, a decline of 1.8 percent from baseline levels. In comparison, with the EITE provisions, we estimate net farm income would fall by an average of $0.6 billion annually over 2012-18 in real 2005 dollars. However, benefits to agriculture from an offsets market rise over time and will likely overtake costs in the medium and long term.

2. The EPA is currently working on the regulations to implement the revised Renewable Fuels Standard. As part of this, the EPA is trying to calculate the "international indirect land use changes" attributed to biofuels in an effort to calculate the net greenhouse gas reductions of biofuels. In late May, while speaking to a community forum in Kentucky, you indicated that you believe that indirect land use changes should not be included in the calculation of the carbon footprint for biofuels. Do you still believe that? USDA has a great deal of knowledge when it comes to ag productivity, crop yields, and land use. What specific expertise can USDA lend to this process to ensure that the best and most reliable scientific data is used? In what capacity has USDA provided assistance to EPA during this rulemaking process?

Response: We support the performance of a scientific review of the models and methods used for accounting for international indirect land use change emissions. It will be important to use the best science to support decisions we make in this area. We are committed to working with EPA to evaluate whether available tools are appropriate. As a broader matter, we believe that addressing tropical deforestation is a priority if we are to combat climate change. We are pleased with the provisions in HR 2454 that provide tools and resources to constructively engage developing countries and provide significant incentives to reduce and ultimately halt tropical deforestation.

USDA has a limited number of models that can partially address some of the issues dealing with land use change. We believe the best path for moving forward is to continue to work collaboratively with EPA, DOE and the academic community to further refine existing models to address land use changes. This would be the most expedient process for developing consensus on the effects of biofuels on land use.

During the rulemaking process, USDA discussed many issues with EPA, including:

- Analysis
- Assumptions
- Land types
- Recordkeeping
- where biomass could be produced
- Who/what entity should be responsible for validating or verifying that biomass was produced from planted crops and crop residue that was harvested from agricultural land cleared or cultivated at any time prior to the enactment of the EISA that is either actively managed or fallow and nonforested.

Discussions also included history of land use and potential data available to verify management and usage.

3. We've heard a lot about opportunities for farmers to sell offsets, but it's not always clear how exactly that would work in practice. Since the farmer would actually be selling on a carbon market and offsets would need to be verified and registered, I imagine the process would be a little different from signing up for a farm bill program for instance. Could you walk me through the process a farmer would undertake to receive payment of an offset?

Response: The exact nature of an offset program and the rules governing would need to be established through a formal rulemaking process and undergo thorough review and public comment. In administering this program, USDA would need to cooperate with EPA which, under HR 2454, would have authority for administering the regulatory cap. The following discussion is offered for illustrative purposes only.

Landowners would need to indicate interest in GHG offset program participation to USDA and submit a formal application. Technical service providers could assist landowners in developing a project plan to manage land to produce greenhouse gas offsets. Contracts would be established after USDA approves the plan. If practices specified by the plan have been completed to standards and specifications and verified, then USDA could issue offset credits based on the

emission reductions and carbon sequestration resulting from the implementation of the plan, consistent with the accounting rules established by the regulations governing offsets.
The landowner could hold, sell, or transfer the offset credits to a third party for use in the federal allowance-based emission cap. The third party could submit offset allowances to meet regulatory requirements. Because carbon that is removed from the atmosphere and stored in plants and soils can be released back to the atmosphere, steps to address this potential reversal will be needed.

4. The EPA analysis of the House-passed Waxman-Markey Bill showed that the vast majority of domestic offsets would go toward planting trees and forest management and only a small fraction would go toward agriculture. Can you discuss some of the obstacles to agriculture becoming a major source of offsets and if there are ways to overcome them?

Response: There will be significant opportunities for agricultural producers to play a role in reducing greenhouse gas emissions and increasing carbon sequestration on working farms and ranches. Opportunities include conservation tillage and no-till, nutrient management systems, manure management systems, rotational grazing, the use of cover crops, and reducing emissions from organic soils.

In reviewing EPA's findings of the potential for domestic forestry and agricultural offsets, USDA provided comments to EPA that were reflected in the analysis released by EPA on June 23, 2009. In their revised analysis, EPA noted the following:

- The sources of domestic offsets modeled represent sources that have significant supply in the FASOM model (the model used by EPA to assess agriculture and forestry offsets) at the relevant allowance prices. The exclusion of other sources in the modeling results does not imply that those sources would not be eligible to receive offsets credits.

- The FASOM modeling did not account for several categories of potential agricultural GHG reductions, including:

    - Improvements in organic soil management;
    - Advances in feed management of ruminants;
    - Changes in the timing, form, and method of fertilizer application; and
    - Alternative manure management systems – other than anaerobic digesters

- Because of how it is handled in the model, agricultural soil sequestration does not show significant supply in the aggregated data. However, detailed FASOM output indicates a 50 percent increase in the percent of cropland using conservation-tillage and no-till by 2020 in response to a $15/ton CO2 incentive payment. Because overall land area in crops declines due to afforestation, the modeling indicates a net decrease in total agricultural soil carbon storage as carbon is transferred from the agricultural soils pool to the afforestation carbon pool.

We are continuing to work with EPA to improve the analysis of greenhouse gas offsets from the forestry and agricultural sectors. We are working with EPA to review assumptions in their baseline analysis and the assumptions regarding land rents and carbon sequestration rates used in their mitigation scenarios.

5. Of the sources of ag offsets, one of the most frequently mentioned is shifting to no-till, but the EPA analysis admits that "agricultural soil sequestration does not show significant supply." Another option is reducing fertilizer use, but the EPA model showed what any farmer could tell you that this results in a decline in yields. Another often discussed offset possibility would be for farmers to install an anaerobic digester, but those can cost hundreds of thousands of dollars and a federal AgSTAR program report found that anaerobic digesters are feasible for only what amounts to about 1 percent of Iowa farms. How would a typical farmer in Iowa be able to receive any significant benefit from selling carbon offsets?

Response: EPA noted that because of how it is handled in the FASOM model (used by EPA for this analysis), agricultural soil sequestration does not show significant supply in the aggregated data. However, detailed results from the FASOM model indicates a 50 percent increase in the percent of cropland using conservation tillage and no-till by 2020 in response to a $15/ton CO2 incentive payment. Because overall land area in crops declines due to afforestation, the modeling indicates a net decrease in total agricultural soil carbon storage as carbon is transferred from the agricultural soils pool to the afforestation carbon pool. This masks the true offset potential of soil carbon sequestration on agricultural lands, which is substantial and a likely source of offset revenues for farmers.

A farmer in Iowa could still receive a benefit by selling carbon offsets from shifting to continuous no-till and reducing fertilizer use. While the total amount of offsets generated nationally from changes in tillage practices and fertilizer use may be small in comparison to those from conversion of cropland to forestry, they can still be significant for individual farmers. While many farmers have been using no-till for years, a much smaller portion of them have been using continuous no-till. For example, many farmers in the Corn Belt use no-till with soybeans, but then switch to conventional tillage when planting corn. Also, many farmers continue to apply greater than university-recommended amounts of fertilizer; the IPM Institute estimates that 53 percent of famers apply 25 pounds more fertilizer per acre than universities recommend. Farmers could earn offsets by optimizing the amount of fertilizer they apply to university-recommended levels as well as by using more efficient application methods and possibly split applications, as well as applying nitrogen inhibitors.

Farmers could also receive benefits from activities, such as buffers and cover crops, which not only sequester carbon and reduce emissions, but also improve water quality and provide wildlife habitat. Iowa farmers could also benefit from conversion of cropland to permanent cover, such as grasses and trees.

6. In order for farmers to get paid for sequestering carbon dioxide in the soil, they would have to switch to no-till, but many farmers have already been using no-till for many years where it's possible to do so. Any farmer that was using no-till before the date we establish in law would not be eligible for payments. This could result in two neighboring farmers

using no-till where the one who had switched over years ago would not see a dime and the Johnny-come-lately would receive a check for doing the exact same thing that his neighbor had been doing all along. This would surely strike most farmers as fundamentally unfair. What can be done to address the fairness issue?

Response: Provisions of HR 2454 address the need to compensate early adopters. Section 740 of HR 2454 gives the EPA Administrator the responsibility for administering an early offset supply for offset projects initiated after January 1, 2001, that meet a set of criteria. Early offset credits should be issued under a state or tribal law or regulation or through a registry that is at least of equal stringency to the criteria and methodologies of the programs established under state or tribal law or regulation. Our understanding of this provision is that it would establish the rules developed under state or tribal law or regulation as the effective minimum standard. Offset projects reported under other registries would only be eligible if these other registries are found to be at least as stringent as the state and tribal registries approved by the EPA Administrator.

Section 504 (a)(2)(B) outlines additionality requirements to be used by the Secretary of Agriculture for agricultural and forestry offsets. These provisions provide exceptions for activities that meet the requirements of Section 740 and allow for early crediting of activities that are readily reversible. Reversible activities include measures that sequester carbon in soils and plants, which could release stored carbon if management practices change. Under the provisions, readily reversible activities are not required to be registered under a regulatory or voluntary registry. For these activities, the Secretary may set an alternative earlier date to begin crediting offsets, not earlier than January 1, 2001. In determining whether to set an alternative date, the Secretary will need to determine that setting such an alternative date may produce an environmental benefit by removing an incentive to cease and then reinitiate activities that began prior to January 1, 2009. The goal of this provision is to improve the environmental performance of the offset provision by removing incentives to reduce existing carbon stocks.

The intent of the Administration is to support forward-looking energy legislation that spurs U.S. development of advanced, clean energy technologies to reduce our dependence on oil, strengthen our energy and national security, create millions of new jobs all across America, and help prevent the worst consequences of climate change. Key underlying issues to balance include attempting to treat all farmers consistently and fairly; ensuring that early adopters are not put at a disadvantage relative to their neighbors and other farmers; and ensuring that overall environmental objectives are met.

7. Do you believe that it is possible for the average farmer, in Iowa or elsewhere, to recover his increased input costs, in terms of higher fuel and fertilizer prices for example, that would be caused by a cap and trade system like in the Waxman-Markey Bill, by selling offsets?

Response: Yes, USDA's preliminary analysis of costs and benefits on the agricultural sector uses energy prices and other information contained in EPA's recent analysis of HR 2454. Let's first look at the cost side. Increases in fuel prices are expected to raise overall annual average farm expenses by about $700 million between 2012 and 2018, or about 0.3 percent. Annual net farm income as a result of these higher energy prices is expected to fall by about 1 percent (not

taking into account possible revenues from offsets). These estimates assume that in the short term farmers are unable to make changes in input mix in response to higher fuel prices, so they likely overestimate the costs to farmers. Fertilizer prices will likely show little effect until 2025 because of the HR 2454's provision to help energy-intensive, trade exposed industries mitigate the burden that the emissions caps would impose.

The agriculture sector also will benefit directly from allowance revenues allocated to finance incentives for renewable energy and agricultural emissions reductions during the first five years of the HR 2454 cap-and-trade program. Funds for agricultural emissions reductions are estimated to range from about $75 million to $100 million annually from 2012-2016.

To evaluate the potential impact on the agricultural sector further out in time, we first examine a simple case that allows producers to change the crops they grow but not how they produce them. This approach is conservative given the observation that energy per unit of output has drastically declined over the last several decades. Nevertheless, the estimated impact of the cap-and-trade provision of HR2454 implies a decline of annual net farm income of $2.4 billion, or 3.5 percent, in 2030 and $4.9 billion, or 7.2 percent, in 2048.

These estimates are likely an upper bound on the costs because they fail to account for farmers' proven ability to innovate in response to changes in market conditions. Our analysis is also conservative because it doesn't account for revenues to farmers from biomass production for bioenergy. A number of studies have examined the effects of higher energy costs with models that allow for expected changes in production management practices and switching to bioenergy crops. Based on the analysis of Schneider and McCarl (2003)[4] for example, allowing for changes in input mix and revenues from biomass production, but without accounting for income from offsets, annual net farm income is estimated to increase in 2030 by about $0.6 billion, or less than 1 percent. By 2045, annual net farm income is estimated to increase by more than $2 billion or 2.9 percent.

HR 2454's creation of an offset market will create opportunities for the agricultural sector. In particular, our analysis indicates that annual net returns to farmers range from about $1 billion per year in 2015-20 to almost $15-20 billion in 2040-50, not accounting for the costs of implementing offset practices.

In the short term, the economic benefits to agriculture from cap-and-trade legislation will likely outweigh the costs. In the long term, the economic benefits from offsets markets easily trump increased input costs from cap-and-trade legislation. Let me also note that we believe these figures are conservative because we aren't able to model the types of technological change that are very likely to help farmers produce more crops and livestock with fewer inputs. Second, the analysis doesn't take into account the higher commodity prices that farmers will very likely receive as a result of enhanced renewable energy markets and retirement of environmentally sensitive lands domestically and abroad. Of course, any economic analysis such as ours has limitations. But, again, we believe our analysis is conservative – it's quite possible farmers will actually do better.

---

[4] Schneider, U. and B.A. McCarl. 2005. Implications of a carbon-based energy tax for U.S. agriculture. Agricultural and Resource Economics Review 34, no. 2 (October).

Senator Kirsten Gillibrand

1. We hear a lot about the potential costs of this bill to the agriculture and forestry sectors of our economy. As the Senator from New York State, a state with $3.6 billion in agricultural productivity, I have on a number of occasions stated my strong support for a bill that will help provide support and aid for small-scale specialty crop producers, dairy farmers and the people who own private forest land to harness these original "green industries" to capture and store carbon.

Mr. Secretary, we do not hear about the impending costs to the agriculture and forestry industries if we allow global climate change to continue unmitigated. Has the USDA undertaken any studies to determine the effect of increased regional rainfall, drought, desertification, and the expanding geographic ranges of predator and insect species?

Response: A report of the U.S. Global Change Research Program (USGCRP) released in May 2008 provides a thorough assessment of the effects of climate change on agriculture, land resources, water resources, and biodiversity. It provides a comprehensive overview of the expected effects of climate change on natural and managed systems. In addition, the June 2009 USGCRP report *Global Climate Change Impacts in the United States* devoted a chapter to agriculture specific impacts and an additional chapter to impacts in the Northeast. USDA was part of the authorship team which synthesized the results of the latest studies, including changes in regional rainfall, drought, and ranges of insect species.

One component of climate change is the increased variability of both temperature and precipitation. There is an increased probability of more extreme temperatures during the summer, which would create a heat stress situation in plants, especially during the flowering stage. Warmer temperatures can cause plants to grow more quickly, but not necessarily bigger. Increases in nighttime temperatures are especially significant and affect grain and fruit development, quality, and productivity. In the northeastern United States, warmer temperatures will allow for a longer growing season for many crops. However, early or late season freezes or frosts are still possible, and plants that start to grow or flower earlier could be damaged early in the growing season. Fewer days of frost in some parts of the country may challenge crops that require freezing in order to bloom, such as plums and almonds. Survival of pollen is sensitive to high temperatures and extreme heat events at this critical stage, even for only a few hours, could reduce grain or fruit production. The direct impacts of climate change will vary by plant species.

Extreme temperatures would affect animals as much as plants. Animals maintain a constant core temperature and, when subjected to extremes of either hot or cold, change their metabolism to regulate their temperature. Extreme heat causes animals to reduce their feed intake, increase their water intake, and reduce their metabolism to maintain healthy body temperatures. For meat or dairy animals, these sudden temperature changes reduce productivity and sometimes cause mortality. Pregnancy rates decrease at higher temperatures. Warmer winters will reduce mortality from freezing and reduce demand for winter forage reserves. The effects of

temperature on animal production are significant, particularly when the extreme events occur and animals do not have adequate shelter.

Precipitation changes across the northeastern United States are projected to increase and include more heavy downpours and large precipitation events. These changes are projected to occur in the winter and spring; however, summer precipitation is expected to decrease. Northeastern agriculture relies on storage of soil water to directly supply plant needs and provide summer irrigation. Increased heavy precipitation in spring could cause increased erosion on soils where adequate conservation practices are not in place. This may also create problems for field operations, leading to difficulties in accessing and traversing fields for planting. Warmer temperatures cause the plants to use more water, which means more precipitation is needed to provide adequate moisture for plant growth. Decreased summer precipitation will create situations whereby plant production is reduced because of short-term drought.

Additional indirect climate change effects on plants and animals may be as large as the direct impacts described above. Indirect impacts include increased disease prevalence, insect infestations, and weed pressures. There will be expanded ranges for insects and increased potential for overwintering of insects and diseases because of the warmer temperatures, which allows them to extend their ranges more rapidly. Weeds are expected to move northward, expand in range, grow more rapidly as a result of the increased concentrations of atmospheric carbon dioxide, and become less susceptible to current methods of herbicidal control.

Producers will need to be aware of, and respond to, both the direct and indirect impacts of climate change on plants and animals to ensure production of a high quality food supply. Changes in yields resulting from climate change will have a direct economic impact on both producers and consumers. The cost of production, processing, storage and transportation are also expected to increase as agriculture responds to increasing threats to production from insects, weeds and pathogens.

Adapting agriculture to these changes will require the development of new farm, ranch and animal production, processing, storage and transportation technologies, new crop and animal varieties that can thrive under these stresses, and new soil, water and air conservation practices that will ensure sustainable ecosystem services. Herbicide effectiveness has been shown to decrease when used on weeds grown under elevated atmospheric carbon dioxide, and thus greater amounts of existing formulations or completely new agrochemicals will be needed that are potent, and yet still environmentally friendly. While increased atmospheric carbon dioxide has been shown to foster greater vegetative biomass production for plants such as those needed for livestock on rangelands, nutrient deficiency can also occur, thus raising the possibility of the need for supplemental nutrients to the plants or directly to the animals.

2. Mr. Secretary, I am particularly interested in the potential legislation's impact on specialty crop producers who do not currently benefit from direct payments or other commodity subsidies. Do you see the offsets market as a positive opportunity for farmers in states like New York that have large specialty crop markets?

Response: We recognize that climate legislation will affect different landowners in different ways. USDA can help smooth this transition by using our Farm Bill conservation programs to assist landowners in adopting new technologies and stewardship practices.

Energy inputs are a relatively small part of production costs for specialty crop production but some efficiency may be gained using energy audits to determine potential energy reductions.

Specialty crop producers such as fruit and vegetable farmers could participate in cap-and-trade via practices to sequester carbon in ground cover and strategies to increase soil organic matter. Practices that reduce pruning and the incorporation of pruned material into the soil (versus removal and/or burning) are also potential avenues.

Participation in cap-and-trade via reduction of emissions of nitrous oxide is also an opportunity. Precision fertilizer management including optimal timing of application, optimal amount for a specific position in a field, and new delivery mechanisms that enable more control offer potentials for reducing nitrous oxide emissions. The use of slow-release fertilizers shows promise for reduced greenhouse gas emissions from agricultural fields, and appears to simultaneously offer opportunity for increased yields.

H.R. 2454 includes a provision that allocates emission allowances to the Secretary of Agriculture to then use as the means of paying for projects that reduce GHG in the atmosphere but do not qualify for offsets, supporting actions to adapt to climate change or preventing conversion of land that would increase GHG. Although the Secretary does not establish the tradable emission allowances, it may be possible for fruit and vegetable producers to receive allowances from programs developed under this Section if they adopt practices that sequester or reduce GHGs that do not qualify as offsets.

It is also worth noting that the House bill includes important provisions regarding how to adapt and increase resiliency to climate change impacts, which will be important for our nation's farmers, ranchers and forest landowners. Ensuring that landowners and communities have the tools and information they need to adapt to climate change is a priority for this Administration.

3. New York State is home to 15 million acres of privately-held forest land – nearly 50% of the state's land base. The average size of a private forest is 21 acres. As the Waxman-Markey bill is currently written, it is prohibitively expensive for these small landowners to participate in a robust offset market. Do you have any ideas for how we can help these landowners continue to maintain and preserve their forest land in the face of encroaching development and other pressures to cut these trees down?

Response: We agree, it may be more difficult for small landowners to participate, but many organizations could be formed to aggregate these landowners into a larger block while providing technical assistance to them for filing and monitoring. This is already occurring in voluntary markets. There are several programs outside of H.R. 2454 that are currently in place and help small landowners preserve privately owned forests. Three such programs are:

- Urban and Community Forestry Program - This is a cooperative program of the U.S. Forest Service that focuses on the stewardship of urban natural resources. With 80 percent of the nation's population in urban areas, there are strong environmental, social, and economic cases to be made for the conservation of green spaces to guide growth and revitalize city centers and older suburbs.

- Forest Legacy Program - The Forest Legacy Program (FLP), a federal program in partnership with states, supports state efforts to protect environmentally sensitive forest lands. Designed to encourage the protection of privately owned forest lands, FLP is an entirely voluntary program. To maximize the public benefits it achieves, the program focuses on the acquisition of partial interests in privately owned forest lands. FLP helps the states develop and carry out their forest conservation plans. It encourages and supports acquisition of conservation easements, legally binding agreements transferring a negotiated set of property rights from one party to another, without removing the property from private ownership. Most FLP conservation easements restrict development, require sustainable forestry practices, and protect other values.

- Forest Stewardship Program - Authorized by the Cooperative Forestry Assistance Act of 1978, the Forest Stewardship Program (FSP) provides technical assistance, through state forestry agency partners, to nonindustrial private forest (NIPF) owners to encourage and enable active long-term forest management. A primary focus of the program is the development of comprehensive, multi-resource management plans that provide landowners with the information they need to manage their forests for a variety of products and services.

Appendix

Table 1: Percentage change in crop average market prices (crop yr basis)

	2012	2013	2014	2015	2016	2017	2018	Average
Corn	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Sorghum	0.2	0.1	0.2	0.1	0.2	0.1	0.2	0.2
Barley	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Oats	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Wheat	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Rice	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Soybeans	-0.1	0.1	0.0	0.1	0.0	0.1	0.0	0.0
Upland cotton	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1

Table 2: Percentage change in livestock prices (cal yr basis)

	2012	2013	2014	2015	2016	2017	2018	Average
Choice steers, Omaha	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hogs price	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0
Broiler price	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0
Non-broiler price	0.0	0.1	0.2	0.2	0.2	0.2	0.1	0.1
Turkeys price	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Eggs price	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Milk price	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0

Table 3: Percentage change in crop average market prices (crop yr basis)

	2027	2028	2029	2030	2031	2032	2033	Average
Corn	1.2	0.7	1.3	0.8	1.5	1.0	1.7	1.2
Sorghum	1.0	0.8	1.2	1.0	1.4	1.1	1.6	1.2
Barley	0.7	0.7	0.9	0.8	1.0	1.0	1.2	0.9
Oats	0.7	0.9	1.1	1.1	1.3	1.3	1.5	1.1
Wheat	0.5	0.7	0.7	0.8	0.9	1.0	1.0	0.8
Rice	0.4	0.4	0.5	0.4	0.6	0.5	0.7	0.5
Soybeans	-0.6	0.5	-0.5	0.4	-0.5	0.4	-0.6	-0.1
Upland cotton	0.2	0.5	0.4	0.5	0.4	0.6	0.5	0.5

Table 4: Percentage change in livestock prices (cal yr basis)

	2027	2028	2029	2030	2031	2032	2033	Average
Choice steers, Omaha	0.0	0.1	0.1	0.3	0.3	0.4	0.3	0.2
Hogs price	0.0	0.2	0.3	0.7	0.7	0.7	0.6	0.5
Broiler price	0.0	0.2	0.4	0.5	0.5	0.5	0.5	0.4
Non-broiler price	0.0	0.7	1.3	1.9	1.7	2.0	1.9	1.4
Turkeys price	0.0	0.2	0.3	0.4	0.4	0.4	0.4	0.3
Eggs price	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1

Milk price	0.0	0.2	0.3	0.4	0.4	0.5	0.6	0.3
Table 5: Percentage change in crop average market prices (crop yr basis)								
	2042	2043	2044	2045	2046	2047	2048	Average
Corn	2.6	1.5	2.9	1.7	3.2	2.0	3.5	2.5
Sorghum	2.1	1.8	2.6	2.0	2.9	2.3	3.2	2.4
Barley	1.5	1.6	1.9	1.7	2.2	2.0	2.4	1.9
Oats	1.5	2.0	2.3	2.3	2.7	2.7	3.1	2.4
Wheat	1.0	1.5	1.5	1.8	1.8	2.0	2.1	1.7
Rice	1.0	0.7	1.2	0.9	1.3	1.0	1.4	1.0
Soybeans	-1.3	1.0	-1.1	0.9	-1.2	0.9	-1.3	-0.3
Upland cotton	0.5	1.1	0.9	1.1	0.9	1.1	1.0	0.9
Table 6: Percentage change in livestock prices (cal yr basis)								
	2042	2043	2044	2045	2046	2047	2048	Average
Choice steers, Omaha	0.0	0.3	0.1	0.5	0.7	0.8	0.6	0.4
Hogs price	0.0	0.3	0.7	1.4	1.6	1.5	1.3	1.0
Broiler price	0.0	0.5	0.8	1.1	1.0	1.1	1.0	0.8
Non-broiler price	0.0	1.6	2.8	3.9	3.6	4.0	3.7	2.8
Turkeys price	0.0	0.4	0.6	0.9	0.8	0.9	0.8	0.6
Eggs price	0.0	0.0	0.1	0.2	0.2	0.2	0.3	0.2
Milk price	0.0	0.4	0.7	0.8	0.9	1.1	1.1	0.7

Senate Committee on Agriculture, Nutrition & Forestry
The Role of Agriculture and Forestry in Global Warming Legislation
Questions for the record
Mr. Jason Grumet
July 22, 2009

Chairman Tom Harkin

1) You have led efforts to formulate bipartisan (or non-partisan) approaches to our national energy issue and our global warming issue for a number of years. Since then, we've seen some remarkable progress on the energy front, especially in the 2005 energy bill and then the 2007 energy bill. This latter bill, in particular, gave us both an increase in CAFÉ standards that we hadn't seen in decades, and a renewable fuel standard that establishes increased development and use of biofuels as a key component of our strategy to reduce dependence on oil.

   How do we assure comparable progress on the global warming front?

The 2005 and 2007 energy bills both enjoyed significant bipartisan support. It is useful to reflect on those legislative experiences in the pursuit of a more bipartisan and constructive climate change debate. One hallmark of both the 2005 and 2007 energy bills is that they focused significant attention on accelerating new alternative energy technologies, while also providing significant support to strengthen the reliability and productivity of current sources of energy. The challenges of transitioning to a secure, low carbon energy system are immense and it will inevitably take decades to be completed. The climate debate might become more bipartisan if it similarly focused more explicitly on the role of traditional energy sources – such as natural gas and nuclear power - during this transition.

In addition, the prior energy bills focused on how to improve our national security through reduced oil consumption – a bipartisan goal. Energy security should be of a bipartisan approach to address climate change. Once a carbon cap is in place, both the direct and indirect emissions from domestic oil production and use must be accounted for under the cap. An increased focus on measures to encourage domestic energy production and improve our energy security might also move the debate in a more bipartisan direction.

Finally, you correctly note that the 2007 energy bill achieved a significant breakthrough in enacting the first legislative increase in CAFÉ standards in thirty years. The fight over CAFÉ had been as divisive as the climate debate. A major factor in changing this dynamic was the willingness of historic CAFÉ advocates and opponents to relinquish past arguments and engage in a creative discussion of how to simultaneously reform and strengthen the CAFÉ program. Similar opportunities exist in the climate debate. Although the current climate politics appear uncompromising, there is a growing agreement among stakeholders and many legislators about key design features. In particular, the growing support for a price collar or strategic credit reserve presents a meaningful opportunity to address cost concerns that are often cited as the basis for opposing climate legislation.

2) One of the challenges in formulating legislation and regulations for an offsets program for agriculture and forestry is to balance the need for integrity of offset projects with the desire to make sure the program starts quickly and provides ample offsets to be effective in helping to control emission allowance costs. Would you comment on this balancing issue, please? Can you point to a precedent where such balancing of interests was effectively addressed?

As part of the 21st Century Agricultural Policy Project, Senators Daschle and Dole addressed the need to balance the integrity of an offsets program with the desire to move quickly and boldly. They concluded that unlimited offset credits should be available for agriculture-based mitigation projects—including soil carbon sequestration projects—that can meet rigorous standards for assuring measurement, additionality, and permanence. At the same time, they recognized that it may take some time to design an efficient system to measure and credit the full range of offset activities. Sequestration activities – just like other technology advancements - - require innovation and experimentation. Even a small number of imperfectly documented offset credits could significantly undermine confidence in the emerging offset market. As a result, early market participants are likely to be highly risk adverse. There is every reason to expect continued controversy, critical media attention and a high degree of scrutiny by oversight bodies. This dynamic has the potential to stifle innovation and slow the learning that will be necessary to build the technical foundation and experience needed to realize the full potential of terrestrial sequestration.

To ensure that we move boldly to develop a robust offset market, Senators Daschle and Dole proposed the creation of an allowance "set aside" to reward agricultural sequestration *in addition to* an offset provision for these activities. By using emission permits to in essence "insure" new and innovative sequestration activities, it will be possible to create a more streamlined approach than under a traditional offset regime - - regardless of which Agency is running the program. Set-aside allowances taken from under the cap provide a particularly effective mechanism for rewarding projects that provide important carbon benefits, but that may have more difficulty meeting these tests, such as no-till practices undertaken long before the cap-and-trade program goes into effect (so-called 'early action' projects). This approach may be especially well suited to rewarding early actors in the agriculture sector for emissions reductions activities adopted prior to implementation of the mandatory policy. Employing both a "set-aside" and offset program will allow agriculture and forestry offsets to get up and running quickly while ensuring the integrity of the program over the long term.

3) Can you go into more detail on the benefits and potential pitfalls of a price ceiling and a price floor in terms of containing costs? Where do you set this ceiling? How would we know enough about the value of these allowances and offsets to accurately set a price ceiling and do so in a way that wouldn't distort the markets or create excess demand?

The National Commission on Energy Policy recently released a paper entitled "Managing Economic Risk" that bears directly on this question (attached).

Since the carbon cap debate began, the ability to form a meaningful consensus has been hampered by disagreements over the predicted costs of compliance. Taken together, even moderately different views on the speed with which new technologies come on line; the cost of these technologies; the availability and price of offset credits and the macro-economic response to a price on carbon, can lead to dramatically different predictions. Because they are predictions, it is impossible to determine who will be correct. As a result, the debate over compliance costs remains a formidable barrier to forging a legislative consensus. For several years, the members of the National Commission on Energy Policy have

advocated for a price ceiling that would set a maximum cap on the costs of permits. NCEP has argued that the starting price for this cap should be set in statute and increase by 5%/yr. We reached this agreement to address the fact that members of our Commission, like Members of Congress have substantially different views on the costs of compliance. The value of a ceiling price is that it enables people to in essence "agree to disagree" while collectively moving forward in support of a cap and trade approach. If compliance costs are low, as many advocates believe, then the presence of a ceiling price is of no accord. Conversely, if prices are substantially higher than predicted, the price cap limits the costs imposed on the economy while technologies evolve that are capable of achieving lower cost reductions.

Recently, the Commission also embraced the adoption of a price floor. Just as some are concerned about potential high costs, others fear that permit prices could dip so low that the program will fail to provide a meaningful incentive for technology advancement and innovation. They argue that the low cost of natural gas, potential for significant volumes of cheap offsets and optimism about increases in energy efficiency and low carbon technology will enable extremely low cost compliance. Setting a price floor provides assurance of a minimum economic incentive to ensure that there is a meaningful commitment to developing that technology that will be needed when the cap tightens in future years. By incorporating both a ceiling and floor price, the "price collar" substantially reduces the uncertainty about the costs of a climate program.

There are two basic approaches to determining where to set the initial floor and ceiling prices. One approach is examine economic modeling of the projected price of a reduction target and set the collar levels at a certain percentage above and below these projections. The other approach is to examine the impact of different price levels on key factors like electricity prices, gasoline prices, coal production etc and set the ceiling at a level that prevents costs from reaching unacceptable levels. NCEP believes that the $10 and $28 levels set in the Waxman Markey bill are reasonable expressions of these two approaches. EPA's projected 2015 cost for the Waxman-Markey bill is $13-$15 per ton. The proposed $28 ceiling is therefore double the midpoint in EPA's projection.

In addition to supporting a straight price-collar, NCEP also supports the concept of creating a "credit-reserve" to create a ceiling price for carbon credits. The credit reserve would function just like a price collar except instead of providing a potentially unlimited number of credits at the predetermined price, the reserve would contain a limited number of credits that have been borrowed from the future (2030-2050) that would need to be eventually paid back. If the credits in the reserve were used, they could either be replaced by using the proceeds from the credit reserve auction to purchase offset credits or the targets in the later years could be marginally tightened to compensate for the relaxation of targets in the early years. While somewhat more complex than a straight forward price collar, the reserve concept enjoys far more support from the environmental community since the mechanism is designed to ensure that the full benefits of the emission target are achieved over the life of the program.

There has been less debate about where to set the floor price. Most who face potential burdens under the program would be very pleased with a $10 permit price and technology advocates seem comfortable that this price would provide at least some motivation for long term technology development.

The presence of a price collar could change the market dynamics, but we view these "distortions" as improving both the functioning and public support for the program. The most significant impact of the price collar is that it will substantially reduce the potential for volatility in the market price for carbon. As was seen in the early years of the European program, credit prices were extremely volatile.

Generally, volatility undermines the ability of firms to make long term investment decisions. Volatility in energy prices also tends to cause great consumer displeasure. Finally, to the extent that the Committee is concerned about the potential for emission credit traders to reap substantial profits at an undesirable cost to the average consumer, reducing volatility substantially reduces the ability of market participants to reap unreasonable profits from this new market. While NCEP shares concerns stated by this Committee that there must be aggressive market oversight, we believe that the adoption of a price collar would substantially reduce the need for and propriety of adopting specific restriction on market-participants and trading instruments beyond the requirements the Administration is proposing for all commodities.

4) The idea of a safety valve is interesting – if prices get to high, somehow releasing more allowances into an auction system for example. But how do we make sure these allowances don't flood the market? Who controls that valve? I'm concerned that if the process isn't transparent or it's too political, it could lead to abuses.

The simplest mechanism to address both long-term cost and short-term price volatility concerns involves capping the price of emissions allowances to ensure that the per-ton cost of mitigation actions required under the program cannot rise above a known level. Functionally, this can be achieved by government making an additional, unlimited quantity of allowances available for sale at a pre-determined price (the safety valve price). To ensure transparency and remove political influence, this maximum price could rise steadily and predictably over time, for example by 5% per year above the rate of inflation. A price cap – or safety valve - is a transparent way to give companies the regulatory certainty needed to optimize long-term investment decisions. On the other hand, a price cap does not guarantee that emissions targets will be met, since if prices rise high enough additional allowances will be sold that allow emissions to exceed the program cap. Ultimately, the level at which the price cap is set will determine the likelihood that this mechanism would be triggered. The farther the price cap is set above the projected allowance price, the less likely it would be that unexpected developments would drive allowance prices to the level of the cap.

Senator Blanche Lincoln

1) Since it is widely recognized that early action on offsets is the key to keeping costs down, what actions should we take to assure that longstanding programs with high environmental standards like Arkansas's own Winrock International's non-profit American Carbon Registry are encouraged to bring new methodologies forward?

Early actors should be recognized for their innovation and we should ensure that they are appropriately rewarded for those efforts. However, recognizing early actions must be balanced with the need for new, additional carbon mitigation and sequestration projects. Early actors could be rewarded in several ways. First, one could recognize projects undertaken after a selected date that meet the test for additionality and can be traded. Second, one could recognize existing contracts for carbon mitigation from the various carbon markets for the length of that contract period. Third, one could recognize carbon mitigation resulting from federal or state conservation efforts as tradable credits that are fully owned by the farmer or rancher. Fourth, one could allow for stacking of diverse credits – a producer would be able to sell conservation, water or other ecosystem services in addition to carbon credits from

the same actions and activities. Finally, the availability of a credit set-aside program would provide even greater ability to reward early action without the obligation to meet additionality requirements.

USDA should review its current research efforts and conservation practices to ensure that the efforts fully support carbon mitigation and sequestration strategies. The Environmental Quality Incentives Program (EQIP) practice standards are currently under review, but they should be vigorously updated to reflect the goals of a transition to a low carbon economy and more fully support energy audits, energy conservation, nutrient efficiency and carbon sequestration. Similar work needs to be done on the enhancement activities included in the Conservation Stewardship Program; these program enhancements should fully support the rapid transition to a low-carbon agriculture system.

2) Do the agriculture and forestry sectors believe that both project developers and future capped entities should have the flexibility of multiple options for early action programs, such as working with Winrock International's American Carbon Registry in addition to the California Climate Action Reserve and regional programs like RGGI that are recognized under Waxman-Markey?

Climate legislation should be about enabling private and NGO sector solutions to complex problems – we believe this is best done through a cap and trade concept. Our desire is for legislation that will set broad, uniform parameters for participation by regulated parties, offset markets, aggregators and bankers. A successful market for carbon offsets will be dependent upon numerous participants.

Senator Charles E. Grassley

1) Do you believe that it is possible for the average farmer, in Iowa or elsewhere, to recover his increased input costs, in terms of higher fuel and fertilizer prices for example, that would be caused by a cap and trade system like in the Waxman-Markey Bill, by selling offsets?

The opportunities for cost recovery or mitigation of increased costs under a cap and trade mechanism for addressing climate change for farmers will depend on an individual farmer's circumstances. The costs of production and operation efficiency are extremely variable from farm to farm. However, farmers will see far more opportunities for cost mitigation from a cap and trade system than a simple carbon tax or regulations issued under the Clean Air Act by EPA. Both of these mechanisms would likely result in higher energy costs, but not provide any mechanisms for farmers to mitigate those cost increases by generating and selling carbon credits. The opportunities for cost recovery resulting from any climate change program will arise from increased efficiency, technology developments and energy conservation. While these measures will be available under nearly every possible option to address climate change, only a cap and trade mechanism allows for market functions to lower costs by trading emissions credits. This will be a significant opportunity for farmers throughout the country who choose to provide and sell carbon credits into these markets. A successful cap and trade mechanism will need to allow for trading of carbon credits that result from active management of working croplands, forest lands and pasturelands. Proper credits should also be granted for soil sequestration, nutrient management, energy conservation and biomass production.

Senate Committee on Agriculture, Nutrition & Forestry
Hearing on "The Role of Agriculture and Forestry in Global Warming Legislation"
Questions for the Record
Dr. John Holdren
July 22, 2009

Chairman Tom Harkin

1) **How would costs faced by farmers from the effects of global warming over the next several decades, such as the need for more chemicals to combat greater pest and disease pressure, increased irrigation costs and/or crop losses due to more prolonged droughts or more severe storms, compare to whatever the higher energy costs they might face under a cap and trade system if we do act to tackle global warming?**

While costs of a cap and trade program for the agricultural sector can be quantified, the costs of doing nothing to stop the increase in greenhouse gases (GHGs) are highly uncertain but have the potential to be extremely expensive, and they could very well be catastrophic for parts of the agricultural sector.

Under a cap-and-trade system such as that proposed in H.R.2454, farm income will initially be impacted by higher costs for energy (petroleum, electricity, and natural gas), but fertilizer costs should not be affected much until 2025 because of provisions in the bill that would distribute specific quantities of emissions allowances to entities such as fertilizer manufacturing. An analysis by USDA shows that the agricultural sector would have modest cost increases in the short-term -- less than one percent -- while noting a possibility that these costs might be compensated by revenues from agricultural offset markets). It is reasonable to expect net benefits in the agricultural sector over the long term, in fact, as farmers generate revenue by adopting appropriate management strategies to increase carbon storage while serving as sources of renewable, low-carbon biofuels.

A report published in 2009 by the U.S. Global Change Research Program (USGCRP), *Global Climate Change Impacts in the United States,* provides a comprehensive overview of the expected effects of climate change on agriculture if there are no reductions in GHGs. The report's analysis shows that crop production will be detrimentally affected by increases in weeds and diseases, as well as by increases in insect pests (which benefit from warming). Increases in the frequency and magnitude of temperature extremes, heavy downpours, and droughts are also expected to reduce crop yields according to the USGCRP report. (A newer study just published online in the *Proceedings of the National Academy of Sciences* found that temperature extremes expected under the slowest warming scenario considered could reduce average U.S. yields of corn, soybeans and cotton by 30 to 45 percent by the end of this century, with the decline reaching 60 to 80 percent under the fastest warming scenario.) Weather extremes and increased disease are also likely to reduce livestock productivity.

2) When I reflect on your testimony about the challenges that our changing climates pose for agriculture and forests, I'm inclined to believe that we've been missing the most important point. We're discussing whether farm input prices will rise by 2% or 5% or maybe more, and you're telling us farming as we've known it for the past century may disappear in 10 or 20 years. As a scientist, what do you see as some of the most effective and cost effective actions that we may see that will help to reduce GHG emissions?

There is a wide variety of actions that can significantly reduce GHG emissions[1]. These include many measures for increasing energy end-use efficiency that could have negative costs even in the absence of emissions charges because the cost of the efficiencies is less than the money saved from reduced energy use. Recent studies[2, 3] estimate that the accelerated deployment of relatively straightforward efficiency measures (e.g., increased insulation, more efficient appliances and vehicles, heat recovery, electronic control systems, and improved manufacturing processes) could offset much or all of the U.S. energy consumption increases through 2030 as projected in the 2008 Energy Information Administration's "business as usual" case. In the agriculture sector, wide adoption of conservation tillage is another cost-effective action that has the potential to reduce GHG emissions with net savings in some cases.

A system that puts a price on GHG emissions in place (presumably a cap-and-trade approach such as that in the legislation currently under consideration in the Congress, although this could also be achieved, in principle, by a tax), can marshal market forces to bring about increased deployment of approaches that reduce emissions. Natural gas also will become more competitive with coal for electricity generation, because gas-fired generation emits about half as much carbon dioxide per kilowatt-hour generated as does currently commercial coal technology. The competitive position of nuclear energy, wind, geothermal, biomass-electric, and solar electricity generation vis-à-vis the fossil fuels will improve. Measures for avoiding deforestation and for reforestation and afforestation can offer cost-effective reductions (even aside from co-benefits such as water management and biodiversity preservation) once there is an economic reward for avoiding GHG emissions. As the price placed on GHG emissions increases over time, moreover, even costlier technologies such as CO_2 capture and sequestration for coal-burning power plants may become cost-effective means of reducing emissions – and thus the basis for profitable businesses. Consumers, facing higher energy prices, will also reduce demand, in part by investing in more energy efficient products.

---

[1] IPCC, 2007: Summary for Policymakers. In: Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [B. Metz, O.R. Davidson, P.R. Bosch, R. Dave, L.A. Meyer (eds)], Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

[2] Committee on America's Energy Future; National Academy of Sciences; National Academy of Engineering; National Research Council, 2009. America's Energy Future: Technology and Transformation, The National Academies Press, Washington DC, 668 p.

[3] McKinsey Global Energy and Materials, 2009. Unlocking Energy Efficiency in the US Economy, 165 pp.

Of course, the pace at which technologies are deployed for reducing GHG emissions depends not only the rate at which the economic reward for reducing emissions grows but also on the rate at which the costs of the technologies for emission reduction fall, and that is a matter of the vigor and effectiveness of both public and private research, development, and demonstration (RD&D) efforts in the relevant domains. The Federal government's investments in RD&D across a broad portfolio of GHG-mitigation options are now on a rising trajectory, with emphases including high-performance buildings; advanced manufacturing; advanced vehicles; clean biofuels; wind, solar, geothermal, and nuclear power; carbon capture and sequestration; advanced energy storage; a more intelligent electric grid; techniques for reducing emissions and/or increasing uptake of CO_2 in agriculture and forestry; and more. As the Federal government's research projects successfully mature toward technology development and deployment, private industry investments in these technologies will expand for later delivery to the marketplace. The interagency Climate Change Technology Program (CCTP) is the government's flagship effort for accelerating the development of new and advanced technologies to reduce, avoid, or capture and store greenhouse gas emissions. Twelve agencies, led by the Department of Energy, participate in the Program.

3) **Do you have any thoughts on using biochar for carbon sequestration? Might use of biochar on soils be a truly significant contributor to sequestration in the future?**

There is growing interest in the possible role of biochar as a mitigation technology in which farming practices are modified so as to increase the amounts of long-term carbon storage in agricultural soils. Biochar is a carbonaceous material, analogous to charcoal, derived from pyrolysis – that is, heating in the absence of oxygen – of biomass feedstock such as plant residues and manure. This process also generates substances that could be converted into biofuels. The produced biochar can be added to soils to boost their carbon content, which may convey derivative benefits such as improving the soils' moisture- and nutrient-retention capacity.

Much remains to be learned, however, about how such soil amendments work, including the long-term fate of the added biochar, as well as the effect of biochar on the carbon cycling of other plant residues within the soil column. We need a better understanding of the extent to which biochar utilization can result in a net decrease in CO_2 emissions, how dependent such reductions are on the source material used and the type of pyrolysis process, and the ultimate scope for deployment of this approach. Given biochar's potential for enhancing terrestrial sequestration while also contributing to renewable biofuel production, the approach abundantly merits further consideration and study.

Senator Patrick Leahy

There should be no doubt in any of our minds that agricultural and forestry have a great opportunity to play an important role in efforts to reduce global warming. In fact, some farms and forestry operations are already leading the way to reduce their carbon footprint and have a phenomenal story to tell, while also contributing

financially to their businesses. For example, when Norm Audet started farming back in 1965 with 30 cows in Bridport, Vermont, he never imagined that his Blue Spruce Farm would someday help to power the green mountain state. Today, Norm's three sons: Earnest, Earl, and Eugene run the family farm that not only produces 24 million pounds of fresh, delicious milk a year, but also 1.3 million kilowatt hours of clean, renewable energy in the Central Vermont Public Service Cow Power Program—enough to power roughly 200 Vermont homes annually.

By trapping their farm's methane, Blue Spruce Farm is able to provide the residents of Vermont with clean green cow power. I am thrilled to see the Audets, and other Vermont farmers like them, leading the way to show the potential for changing the way Vermont dairy farms, and farms across the country, can do business while helping the environment.

However, our farmers could do a lot more if we had a legitimate market for ag offsets in place today. With a properly functioning cap and trade system, more of our nation's farmers could find ways for their manure management, grazing, and sustainable forestry practices to generate additional revenue for their operations.

1) **I hear from countless Vermont farmers like the Audets who are changing the way Vermont dairy farms do business, some with methane digesters and others who are changing their grazing rotations and feed rations to reduce the methane their cows produce. These environmental practices are smart business decisions for these farmers that bring in additional revenue and help their bottom line. Can you please tell me how a viable carbon offsets market would change farming in Vermont? How many more methane digesters do you think we could expect to see installed in the state? Moreover, what sort of payments would our farmers possibly see for their offsets and practices?**

The creation of viable carbon offset markets could provide an economic incentive to encourage the adoption of anaerobic digesters as well as other technologies and practices that decrease emissions of CO_2 and other GHGs to the atmosphere. The use of anaerobic digesters to recover methane (biogas) from animal manure for producing electricity, heat, and hot water can offer farmers particular benefits. The digesters reduce energy costs and methane emissions, which contribute to global warming, and they can reduce overall operating costs in places where costs are high for sewage, agricultural, or animal waste disposal. Anaerobic digesters typically require manure from more than 150 large animals to generate electricity cost effectively.

Aspects such as capital investments to install methane digesters, the relative energy price, the prices received by farmers for the electricity produced, and the availability of financial support from local, state and federal sources will all have a tremendous impact on the number of additional digesters installed in Vermont. At the present time there are a number of federal incentives for methane digesters. The American Recovery and Reinvestment Tax Act of 2009 provided for grants or investment tax credits for up to 30 percent of the cost of methane digesters used to produce electricity. The USDA, through

loans and grants by its Rural Development agency, can assist farmers with implementation of methane digesters. Finally, USDA's Natural Resources Conservation Service (NRCS) can make technical assistance available through its Environmental Quality Incentives Program (EQIP) for anaerobic digester design and installation where there is an associated water-quality improvement.

An EPA analysis of H.R.2454 shows that farmers and ranchers would have a variety of opportunities to receive payments for carbon offsets. EPA's analysis indicates that in 2020 agricultural and forest lands could supply 180 million tons of CO_2-equivalent offsets through changes in tillage practices, reductions in methane and nitrous oxide emissions, and tree planting. If these offsets were worth $16 per ton in 2020 (as estimated by EPA in their core scenario analysis), their total value would be close to $2.9 billion.

2) **Incredibly there are still some who discredit the science of climate change and the need for action. Some economists have said that the cost of climate change, if we do nothing to stop it, will be far more significant to producers than the cost of climate policy. Would you agree with that? And in your opinion what are some of the harmful impacts and possible costs to American agriculture and forestry if we do not act soon to reduce our greenhouse gas emissions in this country?**

I agree with the suggestion that the costs to the agriculture sector (and to society as a whole) from the degree of climate change resulting from failure to control emissions of greenhouse gases are likely to be far larger than the costs of controlling those emissions using cost-effective market-based policies like cap-and-trade.

Estimates of the potential costs associated with climate policy, moreover, may not fully capture the economic opportunities, particularly in rural communities, that arise from innovative changes in technologies and practices. For example, with care in choice of locations and methods, we can make our farms and our forests sustainable sources not only of food and fiber but of clean, renewable biofuels to help with the energy side of the solution. The farming and forestry sectors can also be significant sources of profitable emissions offsets created through practices that increase the storage of carbon in soils and trees.

As noted above in the answer to Chairman Harkin's first question, as well as in my written statement for the record of this hearing, failure to reduce the magnitude of the changes in climate expected under continuation of "business as usual" in GHG emissions is likely to lead to large adverse impacts on both agriculture and forestry.

The expected increases in global average surface temperatures from unchecked emissions of heat trapping gases will result in increased incidences of drought, and may foster the spread of plant pests and pathogens. These outcomes are likely to adversely affect agricultural and forest productivity, and further generate hardships, tensions, and increased competition for scarce resources across our country and around the world.

Attempts to maintain agricultural output in the face of these outcomes, as noted in the USGCRP report, *Global Climate Change Impacts in the United States*, are likely to entail increased utilization of water, fertilizers, herbicides, insecticides, and fungicides. The increased use of these relative to crop yield will raise costs to farmers and consumers, not to mention the costs borne by society in connection with increased stress on water supplies and the environmental effects from increased fertilizer and pesticide use.

Senator Charles E. Grassley

1) **Do you believe that it is possible for the average farmer, in Iowa or elsewhere, to recover his increased input costs, in terms of higher fuel and fertilizer prices for example, that would be caused by a cap and trade system like in the Waxman-Markey Bill, by selling offsets?**

As indicated in my other answers above, it is certainly possible under a cap-and-trade system that the average farmer will be able to recover his increased input costs through sale of offsets and feedstocks for biofuel production. USDA recently released a preliminary analysis of the potential economic effects of H.R.2454 on farm energy and fertilizer costs (http://www.usda.gov/oce/newsroom/archives/releases/2009files/HR2454.pdf). Initially farms will be impacted most by direct energy prices, while fertilizer costs will be unaffected until 2025 due to provisions in H.R.2454 that would distribute specific quantities of emissions allowances to "energy-intensive, trade exposed entities" (EITE). EPA's preliminary analysis indicates that fertilizer manufacturing is likely to meet the eligibility criteria for EITE. The USDA analysis concludes that short-term impact on farm income would be a decrease of less than a 1% due to increases in fuel prices, which are expected to raise overall annual average farm expenses by about $700 million between 2012 and 2018. These estimates assume that in the short term farmers are unable to make changes in input mix in response to higher fuel prices, so they likely overestimate the costs to farmers, and they do not account for the potential revenues from offset and biofuels markets. Over the medium-term and long-term, the USDA analysis shows that costs to agriculture rise (3.5% and 7.2% decreases in net farm income in 2030 and 2048, respectively), but, again, these estimates are likely an upper bound on the costs because they fail to account for farmers' proven ability to innovate in response to changes in market conditions and for revenues from offsets and biofuels.

The USDA estimates that annual net returns to farmers from offsets range from about $1 billion per year in 2015-20 to almost $15-20 billion in 2040-50. USDA used EPA's modeled allowance prices and offsets estimates, which take into account the costs of implementing land management practices, to project annual net returns from offsets to farmers and forest owners.

U.S. Senate Committee on Agriculture, Nutrition, and Forestry
The Role of Agriculture and Forestry in Global Warming Legislation
Questions for the Record
Administrator Jackson
July 22, 2009

Chairman Tom Harkin

1) ***Our farmers are very willing to shoulder their share of the nation's commitment to reduce greenhouse gas emissions, but they also are very leery of additional paperwork burdens. They truly are small businesses, many of whom do their own accounting. They have worked effectively for years with the USDA on commodity and conservation programs. For the record, do you support USDA having the authority and responsibility for managing those aspects of our national global warming programs that interface with farmers and foresters?***

ANSWER: While the Administration does not have an official position on this issue, I believe that USDA and EPA would have important roles to play in implementing national global warming programs to effectively achieve needed greenhouse gas reductions

2) ***There has been much concern that the United States will be one of the early countries to adopt climate change legislation; and that without China's, India's and other developing countries agreement ours is insignificant. How do you respond to these critics? What do you believe the United States gains from being a leader on this issue?***

ANSWER: Transforming to a clean energy economy and achieving a strong international climate change agreement are in the best interest of the United States. Other nations are looking to the U.S. as the largest historic emitter of greenhouse gases to play a leading role in reducing global emissions. U.S leadership is key to galvanizing action from other countries and to building the international trust we will need to address this pressing global challenge. In addition to seeking a strong international agreement to combat climate change, President Obama is committed to passing comprehensive clean energy legislation that will help protect our nation from the serious economic and strategic risks associated with our reliance on oil and the destabilizing effects of a changing climate. Climate change legislation will not only advance energy and climate security, but it will also accelerate job creation in emerging clean-energy industries. The link between clean, sustainable energy growth and robust, sustainable economic growth is the hallmark of the 21st century global economy and it is critical that the U.S. takes advantage of this relationship.

Ranking Member Saxby Chambliss

1) ***You note in your testimony that the value of agriculture offsets in 2020 would have a market value of nearly $3 billion, yet, in EPA's economic analysis of H.R. 2454, agriculture soils do not generate any offsets.***

According to the American Farm Bureau Federation, farm income will drop by $5 billion by 2020. If commodity and specialty crop producers only receive, at best, a small portion of the offsets, then it would seem that farmers and ranchers are no better off.

Can you explain how EPA calculates, as you state, "modest costs that farmers would bear likely would be exceeded by direct financial compensation for actions that qualify as offsets"?

ANSWER: EPA's modeling of the Waxman-Markey bill was intended to provide an estimate of domestic offset supply; it was not meant to prejudge what sources would be eligible for offsets. The latest agricultural sector modeling used in support of EPA's analysis of H.R. 2454 actually projects a 59% increase in no-till acreage by 2020 compared to base year practices (in response to a rising $15/ton CO_2 incentive payment). The main point is this: that across all the various scenarios analyzed, there are increases in the share of land under no-till.

The farm economy is highly integrated and complex. EPA's modeling includes cost impacts, but also revenue changes and dynamic responses throughout the crop and livestock sectors as well as consumer and industrial demand. EPA analysis does not, however, permit analysis of changes in welfare at the operational level.

Our analysis suggests that, in many cases, agriculture will see large opportunities for economic benefits under climate legislation, in addition to the environmental benefits such legislation would help achieve.

- Our analysis shows that there will be small increases in fuel prices. EPA projects that starting in 2012, per-gallon gasoline and diesel prices would rise by about two percent over the business-as-usual level.
- Regarding concerns about natural gas prices and their potential impact on fertilizer production and prices, our analysis indicates that, without accounting for the bill's allocation of allowances, the price of natural gas in 2020 would be 1.5 percent lower under the bill than under business as usual. Others have asserted that fertilizer prices will increase, reflecting the carbon content of the natural gas used in fertilizer production. However, the bill's free allocation of allowances to energy-intensive manufacturers will offset the impact of the cap-and-trade program on fertilizer manufacturers' production costs for years.
- Offsets provide significant sources of potential revenues for the agricultural community. Tillage practices and other management decisions can generate substantial carbon sequestration sinks, emissions reductions and sources of low-carbon bioenergy. For example, analysts at Iowa State recently estimated that switching to no-till could earn some farmers $8 per acre in carbon offset revenue.[1]
- International offsets programs that create incentives for the retirement of environmentally sensitive lands abroad will strengthen opportunities for US crop producers in world markets and raise commodity prices.

---

[1] Babcock, Bruce A., Costs and Benefits to Agriculture from Climate Change Policy. Iowa Ag Review Summer 2009, Vol. 15 No. 3

Taking all these together – slight fuel and commodity price changes along with the allowances and offsets provided in the legislation – the revenues generated from climate legislation will in many cases defray and possibly outweigh the costs to agriculture. It should be noted that many of the studies that find substantial cost impacts do not account for the significant sources of increased revenue.

2) ***There has been much discussion regarding the assumptions EPA used to analyze the economic impacts of the House bill. For example, regarding natural gas consumption, the EPA reference case differs markedly with that of the Energy Information Administration (EIA), on average of 5.57 quadrillion BTUs over a 20 year period. Just to put that in context, this is equivalent to 446 billion gallons of gasoline or 200 million tons of coal. As you are well aware, figuring out the answer to a question is often determined by the assumptions and starting point of the analysis.***

Can you explain why EPA decided to use this base assumption rather than the data produced by EIA?

ANSWER: EPA used information that is consistent with EIA data provided in recent reports. The reference scenario used in EPA's ADAGE model is calibrated to EIA's Annual Energy Outlook (AEO) 2009 March release, and the reference scenario used in EPA's IPM model relies upon a natural gas supply model that has similar assumptions and corresponding consumption to the AEO 2009 April release. Natural gas primary energy consumption used in the ADAGE model is consistent with the March release AEO 2009 forecast, and electricity sector natural gas consumption in IPM is consistent with the forecast from the AEO 2009 April release.

Senator Patrick Leahy

1) ***Incredibly there are still some who discredit the science of climate change and the need for action. Some economists have said that the cost of climate change, if we do nothing to stop it, will be far more significant to producers than the cost of climate policy. Would you agree with that? And in your opinion what are some of the harmful impacts and possible costs to American agriculture and forestry if we do not act soon to reduce our greenhouse gas emissions in this country?***

ANSWER: We agree that in the long term, the costs of doing nothing to stop climate change will outweigh the costs of climate policy. The most recent U.S. Global Change Research Program report on climate change impacts on agriculture found that with increased CO2 and temperature, the life cycle of grain and oilseed crops will likely progress more rapidly. But, as temperature rises, these crops will increasingly begin to experience failure, especially if climate variability increases and precipitation lessens or becomes more variable. Furthermore, the marketable yield of many horticultural crops – e.g., tomatoes, onions, fruits – is very likely to be more sensitive to climate change than grain and oilseed crops.

The report also found higher temperatures will very likely reduce livestock production during the summer season, though these losses will very likely be partially offset by warmer temperatures during the winter season.

The report from the US Global Change Research Program, *The effects of climate change on agriculture, land resources, water resources, and biodiversity in the United States,* is available for download at http://www.globalchange.gov/publications/reports/scientific-assessments/saps/sap4-3

Senator Pat Roberts

1) ***Your testimony states that EPA projects agriculture and forestry offsets will have a market value of $3 billion by 2020. How did EPA arrive at this projection? How much of this projected value does EPA believe will come from afforestation of crop or pastureland? How much of this projected value does EPA believe will come from new no-till cropping practices and no-till cropping practices in place since 2001? What is the regional distribution of this $3 billion market value?***

ANSWER: EPA's modeling of the Waxman-Markey bill provides an estimate of total domestic offset supply at projected carbon prices, from which total market value is calculated. Specifically, in the agricultural sector modeling used in support of EPA's analysis of H.R. 2454, in response to a CO_2 incentive payment starting at $15/ton and rising, approximately 14 million acres of afforested acres comes from cropland (6 percent of total cropland), and another 8 million acres comes from pasture, by 2020 (3 percent of total pasture).

Our analysis also shows that across all the various carbon price scenarios we have modeled, there would be increases in the share of land under no-till compared to 2000.

EPA has not analyzed agricultural impacts at a regional level. However, in terms of regional potential, studies by USDA and others show the 12 Southern states have the greatest regional potential for increased afforestation.

Senator Mike Johanns

1) ***Administrator Jackson stated before the Senate Environment and Public Works Committee that, "U.S. action alone will not impact CO_2 levels."***

Considering this fact, combined with the fact that China, India, Brazil, and others are unlikely to change their emission patterns – and some have flat-out stated as much – isn't it true that we have no idea whether cap and trade will have any impact on the environment? Isn't that a big risk to take when we know costs will skyrocket and jobs will be lost? With the global economy in the shape that it's in, could there be a worse time to be considering such

initiatives? Can you tell me that companies based in the U.S. won't move their operations overseas? Or simply close their doors?

ANSWER: EPA's analysis of HR 2454 specifically considers the impacts of the bill on global trade and emissions. The analysis shows that, with the output-based rebates proposed for energy-intensive and trade-sensitive U.S. manufacturing in the legislation, the impacts on U.S. manufacturing output and on international leakage of carbon emissions are minimal.

EPA believes that U.S. action through a cap and trade bill would: (1) advance energy efficiency and reduce reliance on oil; (2) stimulate innovation in clean coal technology to ensure that coal remains an important part of the U.S. energy portfolio by capturing harmful greenhouse gas emissions before they enter the atmosphere; (3) accelerate the use of renewable sources of energy, including biomass, wind, solar, and geothermal; (4) create strong demand for a domestic manufacturing market for next generation energy technologies that will enable American workers to serve in a central role in our clean energy transformation; and (5) play a critical role in job growth in the clean energy sector – from retooling shuttered manufacturing plants to make wind turbines, to using equipment and expertise in drilling for oil to develop clean energy from underground geothermal sources, to tapping into American ingenuity to engineer coal-fired power plants that do not contribute to climate change.

2) ***EPA's website contains an analysis of H.R. 2454, dated less than a month ago. Page 32 of the analysis says: "overall land area in crops declines due to afforestation." Clearly a model and analysis of the House bill exist. What does the model say? How many cropland acres will come out of production? How many acres will be planted into trees due to cap-and-trade? And from which states?***

ANSWER: EPA uses several detailed economic models to analyze climate change policy proposals, including HR 2454. The domestic agriculture and forestry model results show that under HR 2454 some cropland shifts to forest. For example, at a carbon price of $15/ton and rising, economic modeling suggests farmers would choose to transition approximately 14 million acres of cropland to forested land cumulatively from now to 2020, less than 6 percent of total farmland acres available. The models suggest another 8 million acres (net) would transition from pasture to forest land, less than 3 percent of pastureland, by 2020.

Our model does not break down results per state. However, in terms of regional potential, studies by USDA and others show the 12 Southern states have the greatest regional potential for increased afforestation.

3) ***USDA's estimate notes on page 4 that fertilizer costs would likely be unaffected until 2025 due to provisions in H.R. 2454 that distribute specific quantities of emission allowances to "energy-intensive, trade exposed entities." Footnote 4 on page 4 further specifies the source of the allowances identified in the estimate. Please provide an aggregate estimate of the total industry, based on the value of goods and services produced, that is eligible for these allowances. Please also provide an estimate of the number or specific portion of the total allowances made available by the program you identified that would be awarded to nitrogenous fertilizer manufacturing.***

ANSWER: If this legislation is enacted, EPA will determine, by rulemaking, the actual amounts of emission allowance rebates that will be given to each facility. In the interim, we have developed estimates of the implications of this aspect of the bill using current data. The total value of shipments estimated for facilities in the industrial categories assumed to be eligible for emissions allowance rebates due to their energy and trade intensive nature is $570 billion in 2007, with total emissions amounting to 738 MMT CO2 equivalent. Based on the most current data, the portion of allowances that we estimate would be made available for the nitrogenous fertilizer industry is about 5 percent of the total available for energy-intensive, trade-exposed industries. Until 2024, we expect that the bill's rebate and allocation provisions would provide 100% of the allowances or allowance value required to cover both direct and indirect emissions based on output. The output-based rebates phase out between 2025 and 2035.

4) ***Do you have any analysis that shows increases in the costs of gasoline, diesel fuel, and electricity for Nebraska farmers?***

ANSWER: No, EPA analysis did not attempt to disaggregate results to the state level.

5) ***Do you have any analysis that shows that these increased costs will be exceeded by other sources of income within my state?***

ANSWER: No, EPA analysis did not attempt to disaggregate results to the state level.

6) ***Does the result of your analysis vary at all based on what crops a producer is growing?***

ANSWER: Yes, the FASOM model includes all major and specialty crops.

7) ***Does it vary based on whether a grower uses irrigation***?

ANSWER: Yes, the FASOM model includes different production methods including irrigated and non-irrigated production.

8) ***What about an analysis of how the legislation will affect farmers and ranchers who produce cattle, dairy, pork, sheep, chicken, and turkey?***

ANSWER: The farm economy is highly integrated and complex. EPA's modeling includes dynamic responses throughout the crop and livestock sectors as well as consumer and industrial demand. The FASOM model includes all major and specialty crops, different production methods including irrigated and non-irrigated production, and all the listed livestock.

9) ***What is the sequestration potential for an average acre of corn production?***

ANSWER: Farmers with land in corn production can adopt various methods to sequester carbon in the soil and reduce other greenhouse gases, including but not limited to: reduced tillage or no-till farming and improved fertilizer management. Estimated ranges for no-till soil carbon sequestration rates as compared to conventional tillage practices vary significantly. Studies report ranges including 0.92 CO_2 acre/year C cultivated alfisols in Ohio (Tan and Lal R., 2005)[2], an average of .25 CO_2 acre/year in 32 U.S. locales (West, 2002)[3], .32 - .65 CO_2 acre/year in temperate and tropical regions (Six J., 2002)[4], and the Chicago Climate Exchange recognizes a national rate of 0.5 metric tons CO_2 per acre annually.[5]

For example, if a corn farmer chooses to apply no-till techniques instead of conventional cropping activities, this shift alone can reduce land-use CO_2 emissions by about 0.4 tons of CO_2 per acre per year, depending on soil characteristics. With a $20/ton CO_2 price, this results in about $8 per acre in offset value.[6] No-till also can provide other ancillary benefits, such as improved soil structure and water infiltration, as well as fuel, fertilizer and irrigation savings.

10) How much sequestration potential is available through modification of tillage practices?

ANSWER: It is important to highlight that the effect of tillage practices on soil carbon sequestration rates vary according to soil attributes (e.g. soil composition, moisture, soil temperature) as well as depth from the surface. Estimated ranges for no-till soil carbon sequestration rates as compared to conventional tillage practices vary significantly. Studies report ranges including 0.92 CO_2 acre/year C cultivated alfisols in Ohio (Tan and Lal R., 2005)[7], an average of .25 CO_2 acre/year in 32 U.S. locales (West, 2002)[8], .32 - .65 CO_2 acre/year in temperate and tropical regions (Six J., 2002)[9], and the Chicago Climate Exchange recognizes a national rate of 0.5 metric tons CO_2 per acre annually.[10]

Researchers from Oak Ridge National Laboratory, University of Tennessee, and Kansas State University also examined CO_2 emissions from cropland production. They found that land-use emissions from some crops can be reduced by half if farmers shift from conventional tillage to

---

[2] Tan Z., and Lal R. Carbon sequestration potential estimates with changes in land use and tillage practice in Ohio, USA. (2005) Agriculture, Ecosystems and Environment, 111 (1-4), pp. 140-152.

[3] West Tristram O. Net Carbon Sequestration in Agriculture: A National Assessment Environmental Sciences Division, Oak Ridge National Lab., Oak Ridge, TN. (2002)

[4] Six, Johan, et al. Soil organic matter, biota and aggregation in temperate and tropical soils – Effects of no-tillage. Agronomie 22 (2002) 755–775

[5] CCX Offset Project Protocol: Agricultural Best Management Practices – Continuous Conservation Tillage and Conversion to Grassland Soil Carbon Sequestration

[6] Babcock, Bruce A., Costs and Benefits to Agriculture from Climate Change Policy. Iowa Ag Review Summer 2009, Vol. 15 No. 3

[7] Tan Z., and Lal R. Carbon sequestration potential estimates with changes in land use and tillage practice in Ohio, USA. (2005) Agriculture, Ecosystems and Environment, 111 (1-4), pp. 140-152.

[8] West Tristram O. Net Carbon Sequestration in Agriculture: A National Assessment Environmental Sciences Division, Oak Ridge National Lab., Oak Ridge, TN. (2002)

[9] Six, Johan, et al. Soil organic matter, biota and aggregation in temperate and tropical soils – Effects of no-tillage. Agronomie 22 (2002) 755–775 755

[10] CCX Offset Project Protocol: Agricultural Best Management Practices – Continuous Conservation Tillage and Conversion to Grassland Soil Carbon Sequestration

no-till practices. The transition to reduced-tillage practices from 1990–2004 produced an estimated net CO_2 emissions reduction of 8.8 million metric tons.[11]

11) How many offsets does your analysis show are purchased by United States entities for meeting requirements under the caps imposed by the House bill?

ANSWER: EPA's analysis of H.R. 2454 indicates that domestic offsets are used to offset 171 MtCO2e of emissions in 2015, 176 MtCO2e in 2020, 287 MtCO2e in 2030, and 643 MtCO2e in 2050. The analysis also shows that international offsets are used to offset 1,048 MtCO2e of emissions in 2015, 1,021 MtCO2e in 2020, 1,070 MtCO2e in 2030, and 1,139 MtCO2e in 2050.

12) What are the total non-U.S. offsets purchased?

ANSWER: EPA's analysis of H.R. 2454 indicates that international offsets are used to offset 1,048 MtCO2e of emissions in 2015, 1,021 MtCO2e in 2020, 1,070 MtCO2e in 2030, and 1,139 MtCO2e in 2050.

13) Does your analysis show the countries that are the recipients of this money?

ANSWER: No, EPA's analysis does not indicate which countries the international offsets would be purchased from. EPA models a global market for international GHG abatement with competing demands for offsets from other countries that have GHG cap & trade policies in place.

While the model determines the amount of abatement different regions are supplying to the global market, the amount different regions are demanding from the global market, and the price at which this global market clears, it cannot determine the origin of the international offsets purchased by a single participant in the global market.

14) Where does the income from cap-and-trade come from?

ANSWER: When allowances are auctioned under a cap-and-trade program, as is proposed by the Waxman-Markey bill, these auctions will generate revenue associated with the sale of allowances.

Senator Charles E. Grassley

1) We've heard a lot about opportunities for farmers to sell offsets, but it's not always clear how exactly that would work in practice. Since the farmer would actually be selling on a carbon market and offsets would need to be verified and registered, I imagine the process would be a

[11] Richard G. Nelson, Chad M. Hellwinckel, Craig C. Brandt, Tristram O. West, Daniel G. De La Torre Ugarte, and Gregg Marland **Energy Use and Carbon Dioxide Emissions from Cropland Production in the United States, 1990–2004** Published online 6 February 2009; J. Environ. Qual. 38:418–425.

little different from signing up for a farm bill program for instance. Could you walk me through the process a farmer would undertake to receive payment of an offset?

ANSWER: The process a farmer would follow to bring offset credits to the market could vary. A likely scenario is when a farmer decides to pursue an offset project on his or her farm, he or she would sign a contract with an offset project developer or aggregator. That developer or aggregator would then handle the technical work involved with applying the offset project type protocol and requirements to the project and submitting it to the US government for registration and issuance of credits. This third party would also line up the services of an accredited verifier.

2) ***The EPA analysis of the House-passed Waxman-Markey Bill showed that the vast majority of domestic offsets would go toward planting trees and forest management and only a small fraction would go toward agriculture. Can you discuss some of the obstacles to agriculture becoming a major source of offsets and if there are ways to overcome them?***

ANSWER: EPA's modeling of the Waxman-Markey bill was intended to provide an estimate of domestic offset supply; it was not meant to prejudge what sources would be eligible for offsets. We believe offsets could provide significant sources of potential revenues for the agricultural community. Tillage practices and other management decisions can generate substantial carbon sequestration sinks or emissions reductions, dependent on the particular activity. For example, analysts at Iowa State University recently estimated that switching to no-till could earn some farmers $8 per acre in carbon offset revenue. Afforestation on crop or pasture lands is also a potential offset option for farmers.

We are still in the process of analyzing the offset potential for various types of agriculture projects. Other than manure management, no-till operations, and afforestation of agricultural lands, there have been few agriculture offset projects in existing voluntary and compliance markets compared to other types of projects. As a result, we have less of a foundation to draw on in developing project methodologies and protocols for agriculture offsets. EPA and USDA are aware of the work needed to move forward with offsets and other policies for the agriculture sector, and are currently working in these areas (e.g., protocol development, baselines, additionality, leakage and permanence options etc.).

3) ***Of the sources of ag offsets, one of the most frequently mentioned is shifting to no-till, but the EPA analysis admits that "agricultural soil sequestration does not show significant supply." Another option is reducing fertilizer use, but the EPA model showed what any farmer could tell you that this results in a decline in yields. Another often discussed offset possibility would be for farmers to install an anaerobic digester, but those can cost hundreds of thousands of dollars and a federal AgSTAR program report found that anaerobic digesters are feasible for only what amounts to about 1 percent of Iowa farms. How would a typical farmer in Iowa be able to receive any significant benefit from selling carbon offsets?***

ANSWER: Under H.R. 2454, the typical U.S. farmer, including those in Iowa, would gain opportunities to participate in and benefit from greenhouse gas emissions reductions practices

that could create offsets. In fact, Iowa farmers have been on the forefront of developing agricultural soil carbon offsets. A group of Iowa farmers were the first to sell CO_2 offsets generated from agricultural soil sequestration to voluntary carbon markets in 2005, selling over 20,000 tons to the Chicago Climate Exchange. Midwestern U.S. farmers are already participating in U.S. voluntary carbon markets involving about 350,000 acres of no-till farmland and grassland.

Through soil sequestration practices, including no-till, farmers could reduce GHG emissions while earning extra revenue under H.R. 2454. EPA analyses of the bill show that across all the various carbon dioxide price scenarios modeled, no-till acres increase compared to 2000. Specifically, in the agricultural sector modeling used in support of EPA's H.R. 2454 analysis, we see a 59% increase in no-till acreage by 2020 compared to 2000 (in response to a CO_2 incentive payment starting at $15/ton and rising).

Installation of anaerobic digesters for methane capture and combustion is a project type that has a demonstrated track record in the voluntary and compliance carbon markets. In addition, EPA's AgSTAR program has found that more than 6,500 dairy and swine operations are good candidates for these systems. Realization of these projects could help provide farm revenue, avoid the release of millions of tons of greenhouse gases, and generate hundreds of millions of kilowatt-hours of renewable energy.

4) ***In order for farmers to get paid for sequestering carbon dioxide in the soil, they would have to switch to no-till, but many farmers have already been using no-till for many years where it's possible to do so. Any farmer that was using no-till before the date we establish in law would not be eligible for payments. This could result in two neighboring farmers using no-till where the one who had switched over years ago would not see a dime and the Johnny-come-lately would receive a check for doing the exact same thing that his neighbor had been doing all along. This would surely strike most farmers as fundamentally unfair. What can be done to address the fairness issue?***

ANSWER: H.R. 2454 would allow the creation of offset credits for projects that, among other things, can demonstrate that they would provide emission reduction or sequestration benefits beyond business-as-usual practice. The standardized approach (which EPA prefers) to assessing whether a project meets this requirement for "additionality" addresses the fairness issue you raise by determining the business-as-usual "bar" for a logical geographic region. If within the region where the two farmers in your example are located, no-till is not a common practice, then the emission sequestration benefits both farmers – the early mover as well as the "Johnny-come-lately" – achieve through no-till would be considered additional under such an approach. As long as all other requirements were met, particularly the requirement that the practice was adopted after 2001, they would both be eligible to participate in the offsets program.

5) ***Based on Senator Inhofe's line of questioning to you in a recent EPW hearing, you were quoted as acknowledging that based on the EPA chart examined at the hearing, U.S. action alone will not noticeably impact world CO2 levels. Without China and India joining the U.S***

in an international agreement on CO2 levels, farmers will be asked to contribute resources and time to trying to fix a problem that can't be fixed without a larger body. Please explain how our farmers won't be unduly penalized in a world economy when other nations' farmers will not have to incur the increased costs from energy sources that U.S. producers will.

ANSWER: While U.S. action alone will not solve the climate change problem, this emphasizes the importance of U.S. leadership in addressing the problem in order to achieve a global solution. As explained at the hearing by US Secretary of Agriculture Tom Vilsack, if a domestic greenhouse gas cap-and-trade program similar to that included in H.R.2454 is enacted, it will provide American farmers with an opportunity to receive additional income through agricultural and forestry offsets. In addition to higher commodity prices received by agriculture producers, the USDA analysis of H.R.2454 shows that the revenues generated from climate legislation will in many cases defray and possibly outweigh the costs to agriculture, such as an increase in energy prices that our nation's farmers may experience as a result of a greenhouse gas mitigation program.

6) ***The RFS-2, enacted by Congress in 2007, included specific volume mandates for biomass-based diesel, starting in 2009. However, EPA is just now considering the regulations to implement the RFS-2. While the EPA has used its authority to raise the volume mandate to comply with the revised Renewable Fuels Standard, the EPA has not implemented the specific biomass-based diesel mandate. If the EPA implemented the volume specific mandates for biodiesel, it would help this struggling industry by providing market certainty. Has the EPA considered taking action to provide certainty for the biodiesel industry by setting the volume mandates for biomass-based diesel fuel? If not, why not?***

ANSWER: In our May 2009 Federal Register (FR) notice proposing regulations to implement RFS2 requirements for 2010 and later years, and in the November 2008 FR notice announcing the applicable RFS2 standard for 2009, we described our proposal to ensure that the biomass-based diesel mandates -- specifically, the 0.5 billion gallon requirement for 2009 and the 0.65 billion gallon requirement for 2010 -- are met. Under the proposed approach, there would be a single compliance determination at the end of 2010 covering both years and allowing credits generated in 2009 for biodiesel blending to be used for compliance in 2010. This approach to the biomass-based diesel mandates for 2009 and 2010 would provide a similar incentive for biomass-based diesel use in 2009 as would have occurred had we been able to implement the standard for 2009. We believe that the most prudent course of action is to continue development of the final RFS2 rulemaking so the program can be fully implemented in 2010.

7) ***In the rulemaking for the RFS-2, EPA included a calculation for greenhouse gas emissions of biofuels that includes emissions from "international indirect land use changes." EPA acknowledges that the indirect land use change analysis carries a high degree of uncertainty. However, EPA states in the proposed rule, "we believe uncertainty in the effects and extent of land use changes is not sufficient reason for ignoring land use change emissions." However, the impact of this analysis is significant. With the inclusion of international land use changes, EPA estimates that corn ethanol reduces greenhouse gas emissions by 16 % compared to***

gasoline. Without indirect land use emissions, corn ethanol reduces greenhouse gas emissions by 61% compared to gasoline. This is a significant difference based on a lot of uncertain analysis. What level of uncertainty is EPA willing to live with, particularly if it undermines and decimates the domestic production of renewable fuels?

ANSWER: The Energy Independence and Security Act (EISA) mandates that significant indirect effects on greenhouse gas emissions such as from land use change be incorporated into the RFS lifecycle assessment that EPA must establish for determining whether some categories of renewable fuels sold to meet the volume mandates established by EISA meet applicable thresholds for lifecycle greenhouse gas emissions. EPA's proposed methodology includes both direct and indirect emissions impacts. The indirect impacts modeling accounts for emissions from land use change, as well as other, "positive" indirect emissions impacts such as reductions in livestock emissions and shifting of crop production to regions with lower GHG impacts.

There is no question that developing a lifecycle methodology that incorporates indirect effects has been a challenge and requires groundbreaking work. This is why we have taken every opportunity to test our assumptions, minimize uncertainties, and maximize transparency. We turned to many noted experts in this field, including those from industry, academia, and other federal agencies. For example, we met regularly with the USDA and turned to their experts for key data points (e.g. crop yield assumptions). We built on this process by holding a two-day public workshop on the lifecycle methodology and conducting a formal, scientific peer review of key elements of the methodology.

It is also worth noting that we estimate that all 15 billion gallons of renewable fuel (including corn ethanol) mandated by EISA will be grandfathered from the GHG lifecycle emission thresholds established by EISA. In addition, the RFS2 proposed rule provides an option that would allow biodiesel to meet the threshold through the averaging of soy and yellow grease. Therefore, in practice, we expect that the proposed lifecycle methodology would have virtually no impact on the renewable fuels industry

8) ***EPA has always treated emissions from the combustion of biofuels and biomass as "carbon neutral" because those emissions are offset by an equivalent amount of carbon uptake from biomass. Can you elaborate on the differences between the biofuels carbon cycle and the fossil fuels carbon cycle and explain why biogenic carbon emissions are treated as zero because of the uptake credit?***

ANSWER: The combustion of biomass and biomass-based fuels emits CO2, CH4 and N2O. EPA does not assume that, at the national level, combustion of biomass and biomass-based fuels is carbon neutral. The official "Inventory of U.S. Greenhouse Gas Emissions and Sinks", consistent with the Intergovernmental Panel on Climate Change (IPCC) guidelines, accounts for any release or uptake of CO2 from these activities as part of an accounting of changes in carbon stocks (i.e., carbon in trees and soils) on U.S. forest land, grassland, crop land, wetland and settlements. For annual non-woody crops, EPA assumes that the carbon in the harvested biomass is replaced by the following year's uptake, but there could be net emissions of CH4 and N2O, and possible changes (increases or decreases) in soil carbon stocks. An assessment of the

carbon neutrality of biomass and biomass- based fuels used for energy needs to include a comprehensive assessment of the activities and practices that generate the fuels.

9) ***Do you believe that it is possible for the average farmer, in Iowa or elsewhere, to recover his increased input costs, in terms of higher fuel and fertilizer prices for example, that would be caused by a cap and trade system like in the Waxman-Markey Bill, by selling offsets?***

ANSWER: As noted above, HR 2454 provides output-based allowances to energy- and trade-intensive U.S. manufacturing that should offset any fertilizer price impacts attributable to the bill until those allocations phase out beginning after 2025.

Professor Bruce Babcock of Iowa State University published an estimate of the effects of a GHG cap and trade program on Iowa farmers (not including the output-based allowances) in the Iowa Ag Review, vol 15 no 3, July 2009. In his article, he stated that "A widely used estimate of the annual amount by which soil carbon can be increased from adoption of no-till farming is one ton of CO2 per hectare, or about 0.4 tons per acre. At a $20-per-ton carbon price, this amounts to $8.00 per acre." Babcock estimated that the costs of the program to farmers (not accounting for output-based allowances) would be $4.52 per acre.

As explained at the hearing by Secretary of Agriculture Vilsack, if a domestic greenhouse gas cap-and-trade program similar to that included in H.R.2454 is enacted, it will provide American farmers with an opportunity to receive additional income through agricultural and forestry offsets. In addition to higher commodity prices received by agriculture producers, the USDA analysis of H.R.2454 shows that the revenues generated from climate legislation will in many cases defray and possibly outweigh the costs to agriculture, such as an increase in energy prices that our nation's farmers may experience as a result of a greenhouse gas mitigation program.

Senator John Thune

1) ***Is the complete set of economic models used to measure indirect land use associated domestic ethanol production available for comment on EPA's website? If not, when will these models be made public? If so, it is my understanding that these models are being peer reviewed. Who is conducting the peer reviews and will this information be public before a final determination is made on the RFS 2?***

ANSWER: We have made all of our modeling (including all of the assumptions and key variables) available to the public. EPA has both shared this information with interested stakeholders via numerous meetings and presentations and provided it in the public docket for the RFS2 proposed rule. The information available in the docket for public review and comment includes the complete set of the economic models (i.e., FASOM and FAPRI) in their entirety and as configured for RFS2 analysis. A memo posted on EPA's website provides instructions for accessing these models.

The well-established economic models that EPA used in developing its proposed lifecycle analysis have already been peer reviewed. The Agency decided to initiate a peer review of its proposed lifecycle analysis to help respond to stakeholder concerns and to ensure that the

Agency makes decisions based on the best science available. Because the economic models have already been individually peer reviewed, the Agency did not focus its peer review on the individual models. Instead, EPA's peer review focused on four areas of the lifecycle assessment that in particular charted new ground: (1) land use modeling (use of satellite data/land conversion GHG emission factors); (2) methods to account for the variable timing of GHG emissions; (3) GHG emissions from foreign crop production (modeling and data used); and (4) how the models EPA relied upon are used together to provide overall lifecycle estimates.

All of the peer review results and the names of the peer reviewers were posted on EPA's website on August 7, 2009. Eighteen highly qualified peer reviewers were selected independently by third-party contractors following EPA and OMB peer review guidelines. The independent contractors autonomously selected reviewers who are widely published in peer reviewed journals and recognized as leading experts in their respective fields. After identifying the most qualified individuals, the independent contractors screened candidates for possible and perceived conflict of interest.

EPA will consider the peer review results along with public comments received in developing the final RFS2 rule, and will implement the reviewers' technical recommendations to the greatest extent possible.

2) ***Do you believe the intent of Congress was to disqualify new corn ethanol production and soy-based biodiesel production from the new RFS?***

ANSWER: The language in Energy Independence and Security Act (EISA) clearly defines what types of biofuels may or may not be counted towards compliance with the fuel volume mandates in the Renewable Fuel Standard program. The volume standard included in EISA for "conventional biofuel" (defined as ethanol derived from corn starch) allows for up to 15 billion gallons of conventional biofuel to be produced from corn starch and counted toward compliance with the 15-billion gallon mandate. This doesn't limit the ability of producers to produce more ethanol from corn starch, but does limit the volume of ethanol derived from corn starch that can be used for compliance with the conventional biofuel standard. The statute also excludes corn starch-derived ethanol from qualifying for use for compliance with the advanced biofuel standard.

EISA defines "biomass-based diesel" as renewable fuel that meets the definition of biodiesel in the Energy Policy Act of 1992 and that has lifecycle greenhouse gas emissions that are at least 50 percent less than the petroleum baseline. This definition is generally feedstock-neutral, with the exception of biodiesel co-processed with a petroleum feedstock, which is defined as "advanced biofuel" rather than "biomass-based diesel." Therefore, the use of soy as a feedstock in the production of new biomass-based diesel is not limited. The current limiting factor for use of soy-derived biomass-based diesel is the ability of a strict soy biodiesel pathway to meet the minimum greenhouse gas reduction standards as defined in the Act for both the biomass-based diesel and advanced biofuel categories.

3) ***Has the deforestation rate in Brazil increased or decreased in the past five years? Certainly domestic biofuels production has increased since 2004, and if deforestation rates are dramatically decreasing, how can biofuels be blamed for deforestation if the observable data leads to the opposite conclusion?***

ANSWER: According to Brazil's National Institute for Space Research (INPE), the rate of deforestation in the Brazilian Amazon has decreased significantly since 2004. It is also true that domestic biofuel production has increased since 2004. However, these two separate facts are not sufficient to draw conclusions about whether biofuel production causes deforestation, because there may have been other factors that changed during this time period and that may have affected agricultural economy and land use decisions.

Our methodology compares land use changes occurring under two scenarios—one with the RFS volume mandates in place and one without. By comparing the model results with the RFS mandates and the model results without the mandates, we isolate the effects of biofuel expansion because all other factors that affect the agricultural economy and land use are held constant. We are not comparing changes in emissions or land use over time, but comparing the opportunity cost of using a feedstock or land for biofuel production in a given year. This provides a more appropriate comparison for determining whether biofuel production has caused deforestation in the last five years -- what the rate of deforestation in Brazil or other tropical forest countries would have been over the last 5 years without the increase in biofuel production.

4) ***In your testimony, you say that producers should not be concerned about increased costs because certain energy intense industries will receive free emissions. You use the examples of nitrogenous fertilizer manufacturers, wet corn millers, and propane consumers, such as the farmers who use propane for drying corn. Exactly how many free emission allowances will be given to fertilizer manufacturers in 2012? In 2020? Exactly how many free emission allowances will be given to farmers who use propane in 2012? In 2020?***

ANSWER: If H.R. 2454 is enacted, EPA will determine, by rulemaking, the actual amounts of emission allowance rebates that will be given to each qualifying energy- and trade-intensive manufacturing sector. In the interim, we have projected the implications of the allowance rebate provisions of the bill using current data (without a forecast of the value of goods and services produced in 2012 or 2020). Based on that data, the estimated value of shipments for the nitrogenous fertilizer industry is $4.3 billion, with 39.6 mmtCO2e produced, or about 5 percent of the total for energy-intensive, trade-exposed industries. Until 2024, we expect that the bill's rebate and allocation provisions would provide 100% of the allowances or allowance value required to cover both direct and indirect emissions based on output. The output-based rebates phase out between 2025 and 2035.

For propane consumers, the bill provides for allowances to be given to the states for the benefit of consumers, both residential and commercial. The allowances are to be used for cost effective energy efficiency programs, rebates or other direct financial assistance. Propane consumers, together with home heating oil consumers, are to receive 1.875% of allowance value (or the

value of 85.9 million allowances) in 2012 with half of those going toward energy efficiency programs. In 2020, the same group will receive 1.5% of allowance value (or the value of 74.3 million allowances).

5) ***As you know, the House-passed climate change bill (Section 501 of H.R. 2454, definitions section) specifically excludes "agriculture and forestry sectors" from the definition of capped sources in Title III (i.e., the cap-and-trade program). However, the phrase "agriculture and forestry sectors" is not defined in the bill. How will EPA define agriculture sector for purposes of this provision? I assume this would include all farmers and ranchers but you know what they say about assumptions. So, does this include things like farmer-owned cooperatives, which are owned and controlled by their farmer members and play an integral role in my state? How about an ethanol or biodiesel plant? How about organic, first-stage food processors? Where do you draw the line? When you hear – agriculture sector – what do you think of?***

ANSWER: Section 501 of H.R. 2454 would add to the Clean Air Act a definition of "covered entities" that identifies what sectors would be subject to the bill's cap and trade program. Several provisions of this definition shed light on the issue you raise. For example, section 700 (13) (A) of the CAA as it would be amended by H.R. 2454 identifies "any electricity source" as a covered entity, and this would appear to include rural electric cooperatives. Section 700 (13) (H) identifies food processing and ethanol production facilities emitting greater than 25,000 tons per year of carbon dioxide equivalent as covered entities.

In the "Inventory of US Greenhouse Gas Emissions and Sinks," which is the official estimate of national emissions for the U.S., EPA identifies specific agricultural sources of greenhouse gas emissions, including livestock, rice cultivation, field burning, and soil management. Our understanding is that these sources would not be capped under H.R. 2454.

Senator Kirsten Gillibrand

1) ***We hear a lot about the potential costs of this bill to the agriculture and forestry sectors of our economy. As the Senator from New York State, a state with $3.6 billion in agricultural productivity, I have on a number of occasions stated my strong support for a bill that will help provide support and aid for small-scale specialty crop producers, dairy farmers and the people who own private forest land to harness these original "green industries" to capture and store carbon.***

Administrator, we do not hear about the impending costs to the agriculture and forestry industries if we allow global climate change to continue unmitigated. Has the EPA undertaken any studies to determine the effect of increased regional rainfall, drought, desertification, and the expanding geographic ranges of predator and insect species?

ANSWER: Though EPA has not conducted an assessment of the effects of climate change on agriculture and forestry, the U.S. Global Change Research Program – of which EPA is a

participating agency – produced the U.S. Department of Agriculture-led report: "The effects of climate change on agriculture, land resources, water resources, and biodiversity in the United States" that includes much of the information you seek.

This report can be downloaded at: http://www.globalchange.gov/publications/reports/scientific-assessments/saps/sap4-3

2) ***New York State is home to 15 million acres of privately-held forest land – nearly 50% of the state's land base. The average size of a private forest is 21 acres. As the Waxman-Markey bill is currently written, it is prohibitively expensive for these small landowners to participate in a robust offset market. Do you have any ideas for how we can help these landowners continue to maintain and preserve their forest land in the face of encroaching development and other pressures to cut these trees down?***

ANSWER: Avoiding the loss of threatened forest and enhancing forest carbon stocks are important greenhouse gas mitigation opportunities. If avoided conversion of forest and/or forest conservation become eligible project types under climate change legislation, then revenue through carbon credits will help these landowners maintain and preserve their lands. Bundling or aggregation of these small offset projects should help small forest owners overcome the costs of participating in the offsets market on their own.

Senate Committee on Agriculture, Nutrition & Forestry
The Role of Agriculture and Forestry in Global Warming Legislation
Questions for the Record, Mr. Roger Johnson
Hearing date: 22 July 2009

1. ***Senator Blanche Lincoln:*** *Since it is widely recognized that early action on offsets is the key to keeping costs down, what actions should we take to assure that longstanding programs with high environmental standards like Arkansas's own Winrock International's non-profit American Carbon Registry are encouraged to bring new methodologies forward?*

Promoting the development of renewable, low-carbon energy projects and new offset methodologies is fundamental to minimizing the costs associated with potential impacts of regulations on climate change. A portion of the revenue generated from the sale of emission allowances should be allocated to support research and development of carbon sequestering technology, create green jobs, assist low-income consumers, help industries impacted by the effects of climate change, and reward early actors. National Farmers Union (NFU) believes that such strategic support would encourage the development and implementation of new, more efficient methodologies and allow existing programs to remain viable.

All existing rules-based and independently verified and registered tons implemented under current programs, such as the Chicago Climate Exchange (CCX) or American Carbon Registry, should be integrated into the federal program to serve several important policy objectives. Specifically, incorporating existing verified and registered tons will prevent potential backsliding and continue to encourage agricultural offset projects while a federal program is being debated, enacted and refined.

2. ***Senator Blanche Lincoln:*** *Do the agriculture and forestry sectors believe that both project developers and future capped entities should have the flexibility of multiple options for early action programs, such as working with Winrock International's American Carbon Registry in addition to the California Climate Action Reserve and regional programs like RGGI that are recognized under Waxman-Markey?*

Any program which provides scientifically verifiable offsets consistent with mandated standards should be included within the framework of an early action program. Early actors who have entered voluntary, legally-binding contracts with programs recognized under ACES should be compensated for sequestration practices and eligible to participate moving forward. The progressive practices of these early actors represent the very goals of a cap and trade program, and it is fundamental that they be allowed to continue to receive offset credits should their practices, projects and techniques comply with the new protocols developed by the United States Department of Agriculture (USDA).

In order to aggressively address the impacts of climate change, project developers and capped entities should be permitted to maximize the use of carbon offsets generated by the agriculture and

forestry sectors. Such offsets provide the easiest and most readily available means to reduce GHG emissions on a meaningful scale.

3. ***Senator Charles E. Grassley****: National Farmers Union is endorsing the House passed climate change bill. Has NFU done any research to show that offsets under the House bill would exceed the indirect costs that farmers would be faced to pay though fertilizer, electricity, and other input costs?*

NFU has advocated that if properly developed, climate change legislation can provide significant economic opportunities for agricultural communities. Several studies have examined the potential agricultural economic impacts of ACES as passed by the House of Representatives. The most recent study performed by the United States Department of Agriculture (USDA) provided data which strongly indicates that the revenue generated from agricultural offsets such as soil carbon sequestration, methane reduction and nitrous oxide reductions will increase at a more rapid rate and surpass the indirect costs associated with the bill. NFU also recognizes that failure to pass any legislation which addresses the changing climate will have potentially profound negative impacts on the production and sustainability of the agricultural sector. Furthermore, in the absence of a legislation solution, the Environmental Protection Agency (EPA) will move to regulate carbon emissions. A strictly regulatory scheme does not allow producers to mitigate such costs through offset opportunities.

4. ***Senator Charles E. Grassley:*** *EPA numbers suggest very high cost increases to use coal. Since the Corn Belt primarily uses coal to provide our energy needs, do you believe that fuel switching will occur? To which types of fuels? Does NFU have evidence that fuel switching to natural gas or other energy sources won't significantly increase the price of those sources? What does this mean for our rural communities?*

NFU advocates for the development of a renewable electricity standard (RES) which could provide an estimated 20 to 25% of our national energy over the next 20 years. The development of renewable energy sources such as biomass, wind and solar would create economic opportunities in rural America while decreasing American dependence upon foreign oil. The potential wind power within United States could provide more than twice the current amount of American electricity generated while presenting individuals landowners and communities with a significant source of income. Increasing the use of biomass as an energy source holds great economic potential for the agricultural community; the University of Tennessee has estimated that through the implementation of an RES, growing biomass demand would increase net farm income $37 billion by 2025. NFU strongly believes that switching to renewable energy sources holds tremendous economic opportunities for agricultural communities while alleviating our dependence upon foreign and carbon intensive energy sources.

5. ***Senator Charles E. Grassley:*** *The EPA analysis of the House-passed Waxman-Markey Bill showed that the vast majority of domestic offsets would go toward planting trees and forest management*

and only a small fraction would go toward agriculture. Can you discuss some of the obstacles to agriculture becoming a major source of offsets and if there are ways to overcome them?

EPA estimates agricultural soils and forestry lands have the potential to sequester enough carbon to offset 20 percent of annual emissions in the United States. In order to achieve the legislation's primary goal of removing as much GHG from the atmosphere as possible, legislation should not artificially limit the amount of domestic agricultural project offsets. ACES limits the total quantity of offsets to 2 billion tons, split between domestic and international offsets. Domestic agriculture and forestry projects alone have the potential to meet the limit, yet we do not know what other types of non-agricultural activities will qualify under the offset program. In order to aggressively address the impacts of climate change, there should be no limit on offsets, including those generated by the agricultural sector.

Through the adaptation of farming practices, such as the implementation of a no-till technique or the increased efficiency of fertilizer use, farmers would be able to maintain high levels of production while reducing GHG emissions and receiving offset credits. A study released by Iowa State's Center for Agricultural and Rural Development (CARD) indicated that the incentive of potential revenue generated from sequestration practices would result in a significant number of farmers adopting GHG reductive techniques. Congress has the ability to craft climate legislation so that few obstacles exist between agriculture and the offset market. NFU believes the potential economic benefits of sequestration practices will lead to their widespread adoption within the agricultural community.

At the time of the Senate Agriculture committee hearing, enrollment in the Farmers Union Carbon Credit Program reflected the diversity of offset opportunities for agricultural producers. In total, 5,351,444.17 acres had been enrolled in the following practices: no till acres (2,740,798.81 acres); new grass (334,638.482 acres); forestry (6,317.52 acres); and rangeland (2,269,689.36 acres).

In August 2009, Carbon Credit Program grew to 5.5 million acres nationwide with enrollments from landowners in 48 states. Much of the newest enrollment involves native rangeland that is being managed with grazing practices that have shown to increase organic matter and carbon in the soil. Other conservation practices, such as continuous tillage and conversion of cropland to long-term grasses, also earn carbon offsets and remain popular.

6. ***Senator Charles E. Grassley:*** *Of the sources of ag offsets, one of the most frequently mentioned is shifting to no-till, but the EPA analysis admits that "agricultural soil sequestration does not show significant supply." Another option is reducing fertilizer use, but the EPA model showed what any farmer could tell you that this results in a decline in yields. Another often discussed offset possibility would be for farmers to install an anaerobic digester, but those can cost hundreds of thousands of dollars and a federal AgSTAR program report found that anaerobic digesters are feasible for only what amounts to about 1 percent of Iowa farms. How would a typical farmer in Iowa be able to receive any significant benefit from selling carbon offsets?*

Carbon sequestration projects on agricultural lands are the easiest and most readily available means of reducing greenhouse gas emissions on a meaningful scale. The extremely diverse nature of the

agricultural sector allows for an equally diverse number of sequestration opportunities. Farmers who reside in Corn Belt states such as Iowa could potentially generate offsets through shifting to practices such conservation tillage, converting previously unproductive or marginal land into forest or grassland and switching to renewable or carbon neutral fuel sources. In 2007, the University of Iowa, a current member of the Chicago Climate Exchange, reduced its carbon emissions by 46,800 metric tons through the use of biomass as fuel. Such practices, if implemented, could potentially generate significant numbers of carbon offset credits and provide further income for farmers.

7. ***Senator Charles E. Grassley:*** *Do you believe that it is possible for the average farmer, in Iowa or elsewhere, to recover his increased input costs, in terms of higher fuel and fertilizer prices for example, that would be caused by a cap and trade system like in the Waxman-Markey Bill, by selling offsets?*

If administered properly, a cap and trade system can provide significant economic opportunities for the agricultural community. Economic analysis completed by the United States Department of Agriculture indicated the agricultural community will recover indirect input costs and increase the sector's overall net income under the cap and trade system established in the Waxman-Markey bill. Carbon sequestration projects on agricultural lands are the easiest and most readily available means of reducing greenhouse gas emissions on a meaningful scale, and these projects can provide economic benefits for producers throughout the nation. As was demonstrated in the House, farmers want the opportunity to participate in a market-based offset program to achieve environmental and economic wellbeing.

8. ***Senator Charles E. Grassley:*** *Farmers' livelihoods depend on their competitiveness in a world economy. While the U.S. remains a strong player in agricultural trade, I believe that moving unilaterally on a climate change bill, without an international agreement, will put all U.S. industries at a competitive disadvantage. Right now, we have no guarantees that farmer's offsets will exceed the indirect costs they will undoubtedly have to shoulder. Please describe what you foresee as the international economic consequences our producers would encounter if a cap and trade system is put into place in the United States, but not elsewhere in the world.*

NFU believes that the United States is poised to lead the international community in crafting an agreement on climate change mitigation. Failure to reduce GHG emissions poses significant economic impacts on agriculture and populations whose welfare is of special interest to the agricultural community. To state it simply, the cost of no action must become a legitimate part of the ongoing debate. Models of climate change scenarios demonstrate increased frequency of heat stress, droughts and flooding events that will reduce crop yield and livestock productivity. According to USDA, risk of crop failure will increase due to rising temperatures and variable rainfall. Further, earlier spring seasons and warmer winter temperatures will increase pathogen and parasite survival rates leading to disease concerns for crops and livestock.

The Senate has an opportunity to build on the success of the House passed bill and craft legislation that ensures protections for sensitive domestic industries, including agriculture. NFU has consistently called for free and fair trade deals with the international community. Climate change legislation should be no

different. Working with members of the Senate Agriculture and Finance committees, NFU is confident that international competitiveness can be addressed.

9. ***Senator Charles E. Grassley:*** *In order for farmers to get paid for sequestering carbon dioxide in the soil, they would have to switch to no-till, but many farmers have already been using no-till for many years where it's possible to do so. Any farmer that was using no-till before the date we establish in law would not be eligible for payments. This could result in two neighboring farmers using no-till where the one who had switched over years ago would not see a dime and the Johnny-come-lately would receive a check for doing the exact same thing that his neighbor had been doing all along. This would surely strike most farmers as fundamentally unfair. What can be done to address the fairness issue?*

Climate change legislation is aimed at removing the maximum amount of harmful greenhouse gases from the atmosphere. EPA estimates agricultural soils and forestry lands have the potential to sequester enough carbon to offset 20 percent of annual emissions in the United States. A properly crafted offset and allowance program can both reward early actors for their progressive practices and permit producers to participate in future carbon mitigation programs.

American Forest Foundation

1111 Nineteenth Street, NW
Suite 780
Washington, D.C. 20036

September 12, 2009

The Honorable Blanche Lincoln
Chair, Senate Agriculture Committee
328A Russell Senate Office Building
Washington, D.C. 20510

The Honorable Tom Harkin
Member, Senate Agriculture Committee
328A Russell Senate Office Building
Washington, D.C. 20510

Dear Chairman Lincoln and Chairman Harkin:

Thank you again for the opportunity to testify before your Committee in July, regarding the role of forests in climate change legislation. We appreciate your continued attention and support for addressing the issues facing family woodland owners. We would especially like to thank your staff, Todd Batta for his tireless work on these issues.

As you know, U.S. forests are a necessary element for our nation's climate mitigation strategy. Family woodland owners like me hold over one-third of U.S. forests and are thus a key to the solution. At the same time, climate legislation, if appropriately crafted to contain offset market opportunities and incentives for family woodland owners, can provide additional income streams for family woodland owners, helping keep them on the land and keep the nation's forests intact.

Attached, per your request, are detailed responses to questions for the Congressional record of the July 22nd hearing.

We look forward to continuing to working with you and your staff to craft legislation that will accomplish both our climate and woodland conservation goals.

Sincerely,
/s/
Jo Pierce
Member, American Tree Farm System on behalf of the American Forest Foundation
Baldwin, Maine

Senate Committee on Agriculture, Nutrition & Forestry
The Role of Agriculture and Forestry in Global Warming Legislation
Responses to Questions for the record
Mr. Jo Pierce
On Behalf of the American Forest Foundation
September 12, 2009

Chairman Tom Harkin

Question: Forests today face many raising threats attributed to climate change such as invasive pests, disease, drought and other severe weather conditions. In your testimony you state that the House-passed climate change bill provides many valuable tools for Federal Agencies and landowners to address forest adaptation challenges. But, one area that you indicated might be lacking is "cost share and incentive programs that could be used to help private landowners address specific adaptation projects." In the 2008 farm bill we were able to increase the participation of forested lands and forest conversation practices in many of the existing USDA conservation programs that provide cost-share assistance such as the Environmental Incentives Program.

How can existing conservation programs be modified to ensure that forest landowners have the assistance need to address challenges climate change presents?

Pierce Response: The House-passed climate legislation provides roughly 8.1% of the Natural Resources Climate Change Adaptation Fund for the US Forest Service, for work on federal, state, and private forest lands. This will amount to roughly $42 million annually, for adaptation work on all 752 million acres of forest land in the U.S. Unfortunately, while the US Forest Service does have the authority and the program infrastructure to provide technical assistance, with partnership with State Forestry Agencies, they no longer have the authority to provide cost-share assistance and incentive payments for private landowners that undertake activities related to climate adaptation. This needs to be corrected, to enable the federal and state forest agencies to effectively work with landowners and provide the technical and financial support for undertaking activities that help ensure we'll have healthy, resilient forests in the U.S., even in the face of a changing climate.

Thanks to the leadership of the House and Senate Agriculture Committees, family woodland owners have new opportunities for cost-share assistance in Farm Bill conservation programs administered by the Natural Resources Conservation Service and the Farm Service Agency. While these programs could play a role in addressing forest adaptation, significant modifications would be needed. Such modifications would include direction at the national level, to set forest adaptation as a national priority and targeted funding for this effort.

Instead, we believe US Forest Service, Cooperative Forestry programs are better suited to specifically address forest adaptation. Programs authorized under the Cooperative Forestry Assistance Act provide foresters and landowners with a broad suite of tools to help them manage their forests in response to climate change. Technical and financial

assistance provided through programs such as State Fire Assistance, Cooperative Forest Health, Forest Stewardship and others will be incredibly valuable tools for climate adaptation activities. We urge Congress to make these authorities eligible for natural resources adaptation funds in any climate related legislation.

In addition, cost-share assistance for practices will be needed. To provide this assistance, in conjunction with technical assistance, the Forest Stewardship Program should be amended to include a cost-share assistance component, directed at practices that improve the resiliency and management of forests in response to climate change.

We believe strongly that the US Forest Service and state forestry agencies are uniquely equipped, with existing forestry capacity, to work with landowners on this complicated but incredibly important effort. This is especially true because of the work State Forestry agencies are currently undertaking, through the State Forest Resources Assessment and Strategy process, directed in the Farm Bill, to identify priority forest issues, like adaptation, and develop a strategy to address these issues.

Senator Blanche Lincoln

Question: Since it is widely recognized that early action on offsets is the key to keeping costs down, what actions should we take to assure that longstanding programs with high environmental standards like Arkansas's own Winrock International's non-profit American Carbon Registry are encouraged to bring new methodologies forward?

Pierce Response: We strongly agree that early actions, particularly those actions taken under an existing voluntary registry, like the American Carbon Registry or the Chicago Climate Exchange, are essential to making a cap and trade system cost effective, especially in the early years. They are also tremendous "test-beds" for offset projects generally and should be encouraged to remain functioning.

To keep these voluntary systems functioning, especially in the short-term, while federal offset markets are developing, we believe there are 3 key components that should be included in climate legislation.

First, a wide range of early action offset projects and other easily reversible projects should be eligible for early action credits under the federal system, if those projects meet the criteria of the federal offset program, including standards for additionality and permanence.

Secondly, those early actions that do not meet the criteria of the federal offset program should be eligible for other rewards and incentive payments, to ensure these actions are encouraged before a cap and trade system is in place and ensure there is not an incentive to stop and/or destroy the gains from the project made prior to the passage of the legislation.

Lastly, climate legislation should also include a Forest Carbon Incentives Program, like that included in the Shaheen-Snowe legislation, S 1576. This legislation will encourage the development of new methodologies that aren't necessarily ripe for offset markets, but clearly have carbon benefits. This Program, could allow voluntary systems like ACR, to continue to function over the long-term, outside an offset market.

Question: Do the agriculture and forestry sectors believe that both project developers and future capped entities should have the flexibility of multiple options for early action programs, such as working with Winrock International's American Carbon Registry in addition to the California Climate Action Reserve and regional programs like RGGI that are recognized under Waxman-Markey?

Pierce Response: Some family woodland owners have already taken action, either in a voluntary market or through some other venue, its essential that all of these actions, regardless of the voluntary system they are registered under, should receive some sort of incentive, whether its through an early action offset credit or through an incentive payment outside the offset market. Many family woodland owners have invested significantly in projects registered on the Chicago Climate Exchange. This is another voluntary system, in addition to ACR that should be eligible for early action, if the federal standards are met.

Senator Charles E. Grassley

Question: Do you believe that it is possible for the average farmer, in Iowa or elsewhere, to recover his increased input costs, in terms of higher fuel and fertilizer prices for example, that would be caused by a cap and trade system like in the Waxman-Markey Bill, by selling offsets?

Pierce response: While I am a farmer, the majority of my land is in forest and that's where I spend most of my time and energy. Most family woodland owners like me do not have as intensive energy and fertilizer needs as those of traditional row crop farmers. Any higher energy prices that may be caused be a cap and trade system will affect woodland owners through the cost of logging operations, but these activities take place much less frequently than an annual crop harvest and most likely, any increased energy cost is placed on the logger and trucker, rather than the owner of the land. A cap and trade bill does have the potential to provide new income streams for family woodland owners, probably more so than farmers because forests have such tremendous potential to sequester and store carbon. However the scale of this new income is unknown and is largely dependant on carbon prices.

Statement of the American Farm Bureau Federation

Senate Committee on Agriculture, Nutrition & Forestry

The Role of Agriculture and Forestry in Global Warming Legislation
Questions for the record

Mr. Bob Stallman

July 22, 2009

600 Maryland Ave. SW | Suite 1000W | Washington, DC 20024 | p. 202.406.3600 | f. 202.406.3606 | www.fb.org

Senator Blanche Lincoln

1) *Since it is widely recognized that early action on offsets is the key to keeping costs down, what actions should we take to assure that longstanding programs with high environmental standards like Arkansas's own Winrock International's non-profit American Carbon Registry are encouraged to bring new methodologies forward?*

We believe any offset projects registered under voluntary programs like the American Carbon Registry are also recognized and certified under any mandatory cap-and-trade program. Most entities availing themselves of offsets registered under the American Carbon Registry will become subject to caps under any mandatory system. The Agriculture Department, which would have jurisdiction over agricultural and forestry offsets under H.R. 2454, should be encouraged to work with existing registries such as the American Carbon Registry to develop and improve offset methodologies.

2) *Do the agriculture and forestry sectors believe that both project developers and future capped entities should have the flexibility of multiple options for early action programs, such as working with Winrock International's American Carbon Registry in addition to the California Climate Action Reserve and regional programs like RGGI that are recognized under Waxman-Markey?*

We believe offsets recognized under existing carbon registries, such as the American Carbon Registry, Chicago Climate Exchange, the California Climate Action Reserve and RGGI, among others, should be recognized under a mandatory cap-and-trade program, and offset credits generated under those programs transferred to the mandatory program. In order to avoid multiple organizations with differing requirements, we believe if cap-and-trade legislation is passed, there should be one single program with one set of rules. For agricultural and forestry offsets, that program would be the one set forth in H.R. 2454 under the jurisdiction of the Department of Agriculture. This program should accept offsets certified by these other programs, and incorporate methodologies and take into consideration the operating experiences of these other registries in developing rules and regulations.

Senator Charles E. Grassley

1) Do you believe that it is possible for the average farmer, in Iowa or elsewhere, to recover his increased input costs, in terms of higher fuel and fertilizer prices for example, that would be caused by a cap and trade system like in the Waxman-Markey Bill, by selling offsets?

Given the diversity in American agriculture, encompassing an extremely wide variety of crops, seasons, inputs, processes, markets and other variables, it is difficult to posit an 'average' farmer and how a cap-and-trade system would affect him or her. On balance, however, as we evaluate the proposal that has emerged from the House of Representatives, we see very little prospect that it can be anything but negative for American agriculture as a whole.

Offsets are generally only attractive to capped sector entities if they are lower-cost than the cost of emission allowances. The higher the cost of carbon allowances, the higher potential revenues from offsets. The lower the cost of carbon allowances, the lower the general revenues from offsets. Given this factor, we do not see any scenario where, even in the best case, offset revenues will ever be sufficient to fully defray additional costs.

○