

“Moving to a Bioeconomy—is it Wise?”

Presented at the Short Rotation Crops
International Conference
Biofuels,
Bioenergy,
&
Bioproducts
from Sustainable Agricultural & Forest Crops

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Thank you for inviting me to address your conference. I commend you for your selection of the topic, “Short Rotation Crops: Biofuels, Bioenergy, and Bioproducts from Sustainable Agricultural and Forestry Crops.”

I’m particularly pleased to see the breadth of sponsors for this conference.

I’m also pleased to see the list of sponsors includes some of my REE agencies.

This conference is a wonderful opportunity for those involved in bioenergy from an agriculture and forestry perspective to exchange information with other scientists.

Agriculture and forestry face some of the same challenges----developing sustainable feedstock production; developing new dedicated bioenergy trees and crops; dealing with land-use issues; and developing harvesting and marketing practices and institutions to ensure a steady supply of biomass.

We also share a lot of commonalities in developing economical conversion technologies for woody biomass, perennial grasses and other bioenergy crops.

There's a lot of public and private investment taking place around the world in both agricultural and forestry research so it's to everyone's benefit that we collaborate to exploit those areas of common interest to achieve our common goals.

Minnesota is a perfect place to talk about bioenergy. The State of Minnesota and Governor Pawlenty are true leaders in renewable energy. As you may already be aware, Minnesota was one of the first states to develop producer-owned ethanol plants; was the first to require the use of biodiesel; and is the third largest producer of wind energy in the U.S.

With its abundant natural resources and two-thirds of the state dedicated to agriculture and forestry, Minnesota is also well-positioned to be a leader in cellulosic ethanol from agriculture and forestry biomass and a leader in achieving sustainable energy security. That's what renewable energy, including biofuels is really about- energy security.

I've chosen as the topic for my presentation, "Moving to a Bioeconomy—is it Wise?" The answer is easy. Yes, most emphatically it is wise. Now I'd like to spend the remainder of my time this morning supporting that answer.

Indeed, we don't have any choice but to shift our civilization and our technology and science in the direction of sustainability.

Let us invest a couple of minutes of our time to build the case why we must move to a bioeconomy. Then, I'd also like to share with you what my office is doing to make it happen.

Energy security is one of the most important challenges the world faces today. Our reliance on petroleum has left the world's economies vulnerable to oil price and production fluctuations and contributed to greenhouse gas emissions and other pollutants.

We in the U.S. have seen the day of reckoning coming for many years. For most of the 20th century, we were accustomed to expanding energy consumption with minimal concerns about the constancy of supply or sharp price escalations.

It is interesting to note that in 1950, the United States provided 52 percent of the world's crude oil production; by 1997 that figure dropped to 10 percent.

Our wake-up call came in the early 1970s when oil supplies and prices fluctuated wildly and culminated in the 1973 oil embargo by OPEC. Even

then our reliance on imported oil was only 28 percent—today we import more than 60 percent of our oil. Had this incident happened in the current time, we would have had a real catastrophe.

I'd like to start with a few facts.

Fact No. 1

Fossil energy is finite and that means such energy supplies will eventually be exhausted. In the span of our civilization, the era of fossil energy is just a “blip” of time—only about 150 years so far out of 10,000.

Keep in mind that in the early days of our civilization when our species were “hunters and gatherers”, food was a finite resource and the planet only supported about 5 million people.

As agriculture progressed, we developed a sustainable food supply. The world population didn't reach 1 billion until 1820. Today the planet supports over 6 billion people, and the world's population is projected to reach 9 billion by the middle of the century.

Fact No.2

The world has a great and growing appetite for oil. We in the US, import over 13 million barrels of oil per day, making the U.S. the largest importer of petroleum. We import more than the next three largest oil importing countries, Japan, China, and Germany, combined!

Fact No.3

Our cost for importing foreign oil is now almost 2 billion dollars per day and likely to increase in the future. That makes our yearly cost for importing oil at over 700 billion dollars per year. The top suppliers of petroleum to the U.S. are Canada, Saudi Arabia, Mexico, Venezuela, and Nigeria.

Fact No.4

We use about 21 million barrels of oil per day. And while the U.S. consumes 25 percent of the world's energy, we comprise only 5 percent of the world's population.... compared with China, who consumes only 11 percent of the world's energy, yet accounts for 21 percent of the world's population.

I might point out that these figures are rapidly changing as China, India and several other countries increase their appetite for oil. Many countries are increasing their average standard of living and thereby increasing energy consumption. For example, China is adding over 8 million automobiles each year. India is also developing a new automobile that will put that country on wheels.

Fact No.5

Oil is also getting harder to find - established oil and gas fields are maturing or they are in difficult areas to access, such as the Arctic or in deep crevices of the ocean.

Fact No.6

Some of the most readily available sources of energy are in unstable regions of the world, often controlled by governments that are not always friendly toward the West.

Fact No.7

Experts are saying we will soon reach global “peak” oil - if we haven’t already. Unless there are multiple new discoveries, this event will occur in

the foreseeable future according to most experts. This time the solution cannot be for each country to import more oil—where will it come from? This is certainly a sobering thought.

During the Oil Embargo of the '70's, world oil suppliers were operating at about 65 percent capacity. Today this level is over 95 percent, closer to 98%--Not much room for increasing supply. Clearly, the world must move to more sustainable, renewable energy.

Renewable energy, including the development of sustainable biofuels, is part of the solution to ensuring energy security for the future. Sustainable biofuels production is truly a “Grand Challenge”; however it also is a golden opportunity for agriculture, forestry, and rural communities everywhere—one we cannot afford to miss.

Energy captured from the sun in the form of biomass has tremendous potential to help mitigate effects of CO₂ accumulation on the atmosphere, and well as help secure energy supplies through domestic production.

As we move to the bioeconomy we must consider all of our options. This includes wind, solar, hydro, geothermal, nuclear, hydrogen, ocean waves and ocean and river currents and as yet unnamed “wonder” inventions. Each of these approaches has merit. Of course much research must be done in order for these approaches to reach their full potential.

In the United States our energy strategy is focused on developing a wide variety of renewable energy solutions. There is no “silver bullet” solution to rising fuels prices and addressing the energy challenge, but rather biofuels are part of a “shotgun” effort which also includes other alternative energy sources, conservation and more efficient energy use.

Let me emphasize conservation and efficiency are truly the low hanging fruit.

Today we want to consider one of the approaches – solar.

Of course the sun is the only ultimate energy source—and according to most experts, even it will burn out in 4 to 6 billion years. Energy from the sun is impressive. In fact, the sun supplies more than enough energy in

one hour to supply earth's needs of a year. We just have to learn how to capture the sun's energy in a form we can use.

There are two major approaches to capturing the sun's energy...photovoltaic cells (solar panels) and green plant photosynthesis. The latter process is at the heart of agriculture and forestry. While I want to reemphasize the importance of all energy approaches a good question is why the bioeconomy route? Good question. Here are a few reasons.

1. Versatility of output.

- a. Energy captured from the sun in the form of biomass has tremendous potential to help secure our energy supply through domestic production as well as help reduce greenhouse gases. This issue will probably become even more important in the future.
- b. Further, biomass can serve as a feedstock for not only liquid fuels, but also future fuels, such as hydrogen. Biomass can also be converted to valuable co-products and bioproducts that could make biofuel processing more economical. Much like petroleum is today.

2. We're already good at agriculture and forestry
 - a. We have a demonstrated record of productivity in agriculture and forestry.
 - b. The planet has a great capacity for agricultural and forestry production over a range of geography and climates.
 - c. I emphasize we must not lose sight of our responsibility for food, feed, and fiber needs.
3. Compatible within our society
 - a. Agriculture and forestry are part of our culture since man ceased to be "hunters and gathers".
4. Approach lends it self to definitive research.
 - a. Just as productivity of plant species have been greatly enhanced for production of food, feed, and fiber; there is exceedingly great potential for improvement of plants for energy.
5. Approach can enhance conservation of our land.
 - a. Many potential energy crops are perennials. Such crops provide an excellent means of strengthening conservation measures. Indeed, one of the species that was greatly researched as a means of repairing the land after the Dust Bowl in the U.S. was switchgrass.

b. Forestry is a great protector of the land. Research has shown that forest can protect the land and still provide continuous source of biomass.

I can't pass up the opportunity to comment on some reports we sometimes see in the media. There are those who decry efforts to develop these approaches as a means to address the energy situation. I'll just say agriculture and forestry have done an excellent job of producing food for us, feed for our livestock, fiber for our clothes and homes, and flowers for our landscape. We in agriculture and forestry have a demonstrated record of productivity and success. I think we can also contribute to the energy solution as well.

This is a beginning industry and has and will improve in productivity – eg. even in standard ethanol production the yield has gone from just over 2 gallons per bushel to nearly three gallons in a matter of less than 5 years.

In closing I'd like to share a few of my personal thoughts.

First, advancing sustainable energy for all countries around the world is one of our civilization's greatest challenges. Of course, countries that do not have a supply of fossil energy will suffer first. However, it's important to recognize that countries with fossil energy must realize their resource is finite and one day will be exhausted.

Second, while all approaches have merit and must be utilized, the solar approach through green plant photo synthesis must be an integral part of the mix.

Third, agriculture and forestry have an enviable track record and will be a successful part of the solution—provided they have the research base to develop to their full potential. Research is the key to an energy self sufficient future.

You probably have a very relevant question, “What have you done as Under Secretary for Research, Education, and Economics to move forward?”

Glad you asked.

- We have conducted first REE Energy Summit from which we developed the USDA-Research, Education, and Economics Strategic Energy Plan. The REE Strategic Energy Plan:
- Establishes our Role – “To Lead Research, Education and Extension programs for sustainable production of agriculture and natural resource based renewable energy and efficient use and conservation of energy – for the benefit of rural communities and the Nation.
- Establishes our vision – “Grow a clean, efficient sustainable energy future for America and become a recognized leader in innovative solutions.”
- Identifies four goals:
 1. Sustainable Agricultural and Natural Resource based Energy Production.
 2. Sustainable Bioeconomies for Rural Communities
 3. Efficient Use of Energy and Conservation
 4. Workforce Development for the Bioeconomy
- We have functioning Leadership Teams for each goal. In addition we have key action items to be accomplished under each goal

identified and goal action teams working in each action. (over 35 teams).

- We have convened the partnership energy summit last September and are planning the second Partnership Energy Summit scheduled for September 29th and 30th 2008.
- We have planned and conducted two Bio Energy Awareness Days (BEAD)
- BEAD I was a one-day event conducted within USDA on the summer solstice—to emphasize that the sun is the ultimate source of energy.
- BEAD II was a four day event held June 19 to 22, 2008. Participation included 45 colleges and universities.
- BEAD II was co-sponsored by 25X'25 alliance and included:
 - The Grand Challenge competition
 - Exhibits (both private and public sector)
 - Ribbon cutting for the first ever Power Plants Garden at the U.S. National Arboretum.
 - The Grand Challenge competition (13 universities)
 - Exhibits: private sector 12, public and government sectors 17, and universities 29.
 - Ribbon cutting for the first ever Power Plants Garden at the National Arboretum
- This week in Houston, four nations, including the US, China, India, and Brazil, are holding an International Conference on Sorghum as a Biofuel.

- I invite you to be a part of BEAD III – June 21, 2009
- We have established collaborative research relationships with several countries and continue to offer opportunities for cooperation.

I really am closing this time.

The USDA's Research, Education, and Economics mission area is working hard. This is absolutely necessary in today's fast moving energy-agriculture world.

I suggest to you, that the world needs to understand this agriculture/energy convergence. We used to have the corn hog ratio to estimate opportunities for investment in corn and hog inventories---now we have the corn petroleum oil ratio to relate the capacity of agriculture and energy prices.

All of us--whether producers or consumers of agricultural products--need to be passionate about the business of creating this prosperous future where:

- Energy is clean, abundant, reliable and affordable;
- Agriculture produces food, feed, fiber, flowers, and fuel (energy) efficiently and sustainability; and
- Our environment is enhanced by our activities and actions.

This future will not evolve by itself. It will only come about when we all "get in the same boat and row together." We need the private sector with its business and entrepreneurial men and women who are noted for their zeal, enthusiasm and hard work in pursuing their passions.

In the US the President's goal to produce 36 billion gallons of renewable biofuels by 2022 is highly commendable. We must recognize that replacing gasoline and diesel with biofuels is a short-term fix. In the long term, our planet must become sustainable in energy as it is in food and fiber and the other things that contribute to the quality of life.

We are poised on the brink of one of the greatest challenges in history. Achieving sustainable energy security requires a major commitment in research, education, and extension. But it also requires the maximum support of every single person on this planet and a renewed commitment to agricultural and forestry research. No one group or one segment of our population or a single approach will ensure success.

Join me in assuring that each of our countries does not recede from today's challenge of achieving energy security. Let us build on what we began, but everyone except Brazil lost interest in during the 70s, and create a world where energy is clean, abundant, secure, affordable and sustainable. This time there is no reversing the trend to renewable energy.

These are, indeed, exciting times. Obviously, many of the answers remain unknown. However, we are very close to clearly defining the problem. And that is the first step to solving these questions.

I leave you with this final thought: the fact that the world needs you to devote your talents to helping secure the world's energy future. Energy security will enhance the well-being of all people and enable us to build a prosperous future at the intersection of agriculture/energy.

Let's do it passionately and by working cooperatively. I challenge you to continue your excellent efforts.

Thank you.