

---

# *The USDA's Contribution to the President's Bioproduct and Bioenergy Initiative*

ROGER CONWAY

*Office of Energy Policy and New Uses*

*Office of the Chief Economist at the United States Department of Agriculture  
Washington, DC*

My topic is the role of the United States Department of Agriculture (USDA) in enhancing the development and use of biobased products and bioenergy. In August 1999, President Clinton announced Executive Order 13134 at the USDA along with Secretary Dan Glickman, Secretary Bill Richardson, Administrator Carole Browner, and Senator Richard Lugar.

The very ambitious goal of this Executive Order is to triple the nation's use of biobased products and bioenergy by 2010. Why are we interested in this? From the perspective of the USDA, first and foremost, we want to help improve the rural economy, the farm economy, and the forest economy. This past fiscal year, we spent \$23 billion in direct payments to farmers, the highest amount ever. There is need to find a market-based solution to support agricultural commodity prices. Over the past 20 years, exports for agricultural products have been fairly stable, and we will continue to look at that market as an opportunity. In addition, the market for bioenergy and biobased products has the potential to help raise farm income and strengthen the rural economy. Also, biobased products are environmentally friendly. They have low toxicity, are biodegradable, and have a high flash point relative to petroleum products.

In addition, there is the goal of enhanced national energy security. The high gasoline and oil prices in the spring and summer of 2000 remind us that we are beholden to other countries for much of our energy, and that there is need to increase our domestic supplies. Even though we are more energy-efficient than we have been in the past 20 years, the United States still has an issue with energy security. Bioenergy and bioproducts may not be the whole answer, but they are part of a solution.

In what markets may biobased products compete? There is a \$5.1-billion market in lubricant sales, \$14.6 billion in composites, \$43 billion in paint, and \$77 billion in plastics. These are substantial markets. If the agricultural sector

could gain 5 or 10 percent of each of these, additional demands for farm products would be major contributions to farm income and rural development.

What is the current use of biobased products? Currently 98.15 quadrillion (quads) Btu are being consumed per year by the United States. Although ethanol is the great success story in liquid fuels, contributing about one percent of the transportation fuel, this is only 0.14 quads Btu. Except for the Agricultural Research Service (ARS), there is very little use of biodiesel fuel; it remains in the early developmental stage, especially the 20-percent blends. Biomass in the form of solid fuels is a significant source of energy. The total consumption for the year 2000 is estimated at 2 quads Btu, most of which is direct combustion of forestry residues; in addition, residential use consumes about 0.6 quads. To meet the goal of tripling the nation's use of biobased products, including bioenergy, by 2010, there is much to be done in terms of science, development, and commercialization.

The USDA, with more than a hundred years of experience in developing new products, can contribute to meeting the goal in several ways. In particular, through the 1938 Agricultural Adjustment Act, the ARS created four utilization laboratories at which there has been a great deal of work on bioproducts. Examples include the superslurper and soy ink; a number of products have been commercialized and are marketed. In addition, the Forest Service has seven field-research stations. Tom Jeffries's research, at the Forest Products Laboratory at the University of Wisconsin, is on cellulosic ethanol. Of course, we are proud of the linkages that USDA has with land-grant universities for leveraging research, education and outreach, principally through the Cooperative State Research, Education, and Extension Service (CSREES) by formula funding, competitive grants and special grants programs.

The USDA is ready to meet the challenge to assist the president. We have an effective network for reaching farmers and landowners with education outreach efforts. Not only through the Extension Service, but also with the Farm Services Agency, and the National Resource and Conservation Service (NRCS) through their Resource Conservation and Development Councils (RC&Ds). The NRCS has been helpful in supporting many activities with the Department of Energy (DOE). In addition, we have some effective programs for strengthening rural communities through our Rural Development Mission Area. For example, in conjunction with the Rural Business Service, the Business and Industry Loan Program, and the Cooperatives Program, our cooperatives have assisted in the development of ethanol plants in Minnesota, South Dakota, and Nebraska. In addition, the USDA has an active network through the Foreign Agricultural Service for building future export markets for biobased products.

We have also been developing what we at the USDA think is a good system for coordinating policy for energy and new uses of farm and forest products, *viz.* through the Interagency Bioproducts and Bioenergy Counsel, which President Clinton created. We have within the USDA the Bioproducts and

Bioenergy Coordination Council, led by Richard Holcombe from the Office of Administration, to ensure that we are communicating and not duplicating effort within the Department. In addition, we now have a formal joint Coordination Office with the DOE, in which there are two representatives of the USDA.

The USDA has participated with the DOE in many activities related to biobased products and bioenergy. The Biomass Power for Rural Development Project is an example, with two joint USDA-DOE projects. One DOE-funded project is in the Chariton Valley, IA, where 40,000 acres of Conservation Reserve Program (CRP) land is being experimentally used to grow switchgrass for co-firing and for small-scale gasification, in cooperation with an Iowa utility. In another DOE project, in conjunction with the State University of New York College of Environmental Science and Forestry, Syracuse, NY, the Forest Service and RC&Ds are exploring the use of willows as a feedstock, also for co-firing and gasification.

We have cooperated extensively with the DOE also on conversion technologies for cellulosic ethanol. The USDA and the DOE have funded Lonnie Ingram's research at the University of Florida on cellulosic ethanol, and we are proud of that association. You may know that he was awarded the five millionth patent for that technology (the four millionth was for a microchip). We have hopes that his technology will soon be commercialized at the BC International, Jennings, LA, plant with some funding support from the DOE.

We have worked also in product lifecycle analysis. This is an important issue, since we have to dramatize the net environmental and energy benefits of bioproducts and bioenergy to garner public attention. We have worked with the DOE on biodiesel as well as ethanol and have shown that, in terms of adverse greenhouse-gas emissions there is much less with corn and cellulosic ethanol than with petroleum-based gasoline. Biodiesel emits 70 percent less CO<sub>2</sub> per unit of energy than does its petroleum-based counterpart. Such information is important to the argument to Congress and others that net environmental benefits accrue from these products. At the USDA we believe we can deliver scientific breakthroughs in the area of properties of biomaterials, both for new crops and for new technologies for separation fermentation. The DOE is particularly interested in working with the USDA to accelerate the development and demonstration of biobased products and bioenergy. Through our Rural Development Mission Area, NRCS, and other program agencies, we plan to tailor programs with help from the DOE to facilitate their pre-commercialization projects. The USDA can help identify bioproduct opportunities with high economic potential. We want to be good stewards of taxpayers' money and ensure that our resources are directed toward the biggest return for the investment and a definable market payoff. Economists working with scientists can help find opportunities to marshal USDA's resources productively. Product promotion and education are also important elements for success of the initiative.

The CSREES is proposing an increase in funding for this biobased initiative. In conjunction with land grant institutions three comprehensive projects will encompass research and development, demonstration, and test evaluation of biobased products. The focus will be on lubricants, paints, coatings, and solvents, with performance validation and cost-effectiveness appraisal. Another issue for CSREES in conjunction with the Office of Administration and others is to use the purchasing power of the USDA and the federal government to create markets and find opportunities to demonstrate these products. From these government markets the objective is to develop private-sector commerce.

The Office of Energy Policy and New Uses will identify market opportunities for developing new biobased and bioenergy products. There is an economic procedure for ranking programs. Julian Austin, at the University of California-Davis, has devised methods for ranking scientific programs based on a discounted net-benefit model. My office will appraise these methods in working with the ARS and others, and will look at estimating costs and environmental lifecycles of bioenergy and biobased products. One method is lifecycle cost analysis, with which a procurement manager would compare a biobased product with some other product in terms of the total cost over its lifecycle. Another approach is to look over the entire production and use cycle — e.g. in the case of biodiesel, from soil to tailpipe — to obtain a comprehensive energy and environmental analysis. We have used both types of analysis with some success.

In conclusion, we hope that the new funding we seek will help meet the president's goal of tripling the use of biobased products and bioenergy by 2010, and, most importantly, will create new market demands for agricultural and forestry commodities to increase farm income and strengthen rural communities.