

Cornstalks Aren't Just for Scarecrows Anymore



October 31, 2014

energy.gov

Reanna Trudell - Management Associate, Bioenergy Technologies Office

Daniel Adams - Research Analyst, Bioenergy Technologies Office

For thousands of years, farmers have been using cornstalks to make scarecrows, preventing crows and other predators from destroying their crops. This fall, the Energy Department's Bioenergy Technologies Office (BETO) is using cornstalks for a different purpose---bioenergy production.

Our scientists have identified corn stover, which includes the corn plant's stalks, husks, cobs, and leaves, as a plentiful and reliable feedstock for producing bioenergy. The National Academy of Sciences (NAS, 2009) estimates that there will be 112 million dry tons of stover available for bioenergy production by 2020.

Through its Feedstock Supply and Logistics Technology Area, EERE supports research and development (R&D) efforts to improve the quality and quantity of corn stover resources and ensure that it can be harvested in an ecologically sustainable manner.

Through the Sun Grant Initiative Regional Feedstock Partnership, BETO's Feedstock Supply and Logistics Technology Area is funding corn stover field trials to collect growth data and regulate the removal of corn stover to ensure environmental stewardship. Samples from these field trails are sent to Idaho National Laboratory's Biomass Resource Library to determine conversion performance, as well as storage losses. The library is open to the public and contains more than 65,000 biomass samples, along with their conversion capabilities.

In addition to growth and sustainability data, BETO is also funding R&D in harvesting process efficiency. We're teaming up with manufacturers of harvesting equipment---such as AGCO and FDC Enterprises---to develop innovative logistics equipment that harvests and transports stover while minimizing the introduction of soil and other particulates that can decrease conversion efficiency.

In addition to its feedstock R&D efforts, two BETO-funded integrated biorefineries that use corn stover as a feedstock began production this year: POET-DSM's Project LIBERTY and the Abengoa Bioenergy Biomass of Kansas facility. POET-DSM's Project LIBERTY opened in September, becoming the nation's first commercial-scale cellulosic ethanol plant to use corn waste as feedstock. The biorefinery uses a biological process to convert post-harvest corn stover into biofuel. The Energy Department contributed \$100 million in cost-shared support for the development, design, and construction of this pioneer facility, which has the capacity to produce up to 25 million gallons of cellulosic ethanol annually.

The Abengoa Bioenergy Biomass of Kansas facility opened on October 17 and uses an innovative process to convert a range of agricultural residues into sugars, which are then fermented, distilled, and dehydrated into denatured fuel ethanol for shipping to distribution centers in the region. The biorefinery has the capacity to convert up to 325,000 dry tons of agricultural residues, including corn stover, into 25 million gallons of cellulosic ethanol each year.

This fall, remember that cornstalks aren't just for scarecrows anymore. These Energy Department supported projects are advancing a commercially viable biofuels and bioproducts industry that will increase U.S. national security, drive economic growth, create new jobs, and reduce greenhouse gas emissions.



Corn stover includes plant waste material after harvest, which can then be used in the bioenergy production process. | Photo by Warren Gretz, National Renewable Energy Laboratory



Corn plant's stalks, husks, cobs, and leaves, as a plentiful and reliable feedstock for producing bioenergy. | Courtesy of Abengoa



The Abengoa Bioenergy Biomass of Kansas facility has the capacity to convert up to 325,000 dry tons of agricultural residues, including corn stover, in to 25 million gallons of cellulosic ethanol each year. | Courtesy of Abengoa



The Abengoa Bioenergy Biomass of Kansas uses an innovative process to convert a range of agricultural residues into sugars, which are then fermented, distilled, and dehydrated into denatured fuel ethanol for shipping distribution centers in the region. | Courtesy of Abengoa



POET-DSM's Project LIBERTY opened in September becoming the nation's first commercial-scale cellulosic ethanol plant to use corn waste as a feedstock. | Photo courtesy of POET-DSM



Fermentation tanks at POET-DSM's Project LIBERTY biorefinery in Emmetsburg, Iowa. The biorefinery uses a biological process to convert post-harvest corn stover into biofuel. | Photo courtesy of POET-DSM