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21st Century Cellulosic Ethanol, Biomass, and Biofuels - Wood Chips, Stalks, Switchgrass, Plant Products, Feedstocks, Cellulose Conversion Processes, Research Plans

Department of Energy, U.S. Government

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Fuels derived from cellulosic biomass - the fibrous, woody, and generally inedible portions of plant matter - offer an alternative to conventional energy sources. Here is comprehensive coverage of cellulosic ethanol and related fuels, with valuable information from a DOE Biomass to Biofuels workshop. Cellulosic biomass is an attractive energy feedstock because it is an abundant, domestic, renewable source that can be converted to liquid transportation fuels. These fuels can be used readily by current-generation vehicles and distributed through the existing transportation-fuel infrastructure. The Biomass to Biofuels Workshop defined barriers and challenges to a rapid expansion of cellulosic-ethanol production and determine ways to speed solutions through concerted application of modern biology tools as part of a joint research agenda. Although the focus was ethanol, the science applies to additional fuels that include biodiesel and other bioproducts or coproducts having critical roles in any deployment scheme. The core barrier is cellulosic-biomass recalcitrance to processing to ethanol. Biomass is composed of nature's most ready energy source, sugars, but they are locked in a complex polymer composite exquisitely created to resist biological and chemical degradation. Key to energizing a new biofuel industry based on conversion of cellulose (and hemicelluloses) to ethanol is to understand plant cell-wall chemical and physical structures-how they are synthesized and can be deconstructed. With this knowledge, innovative energy crops-plants specifically designed for industrial processing to biofuel-can be developed concurrently with new biology-based treatment and conversion methods. Contents include: Technical Strategy: Development of a Viable Cellulosic Biomass to Biofuel Industry * System Biology to Overcome Barrier to Cellulosic Ethanol * Lignocellulosic Biomass Characteristics * Feedstocks for Biofuels * Deconstructing Feedstocks to Sugars * Sugar Fermentation to Ethanol * Crosscutting 21st Century Science, Technology, and Infrastructure for a New Generation of Biofuel Research * Bioprocess Systems Engineering and Economic Analysis. * This is a privately authored news service and educational publication of Progressive Management. Our publications synthesize official government information with original material - they are not produced by the federal government. They are designed to provide a convenient user-friendly reference work to uniformly present authoritative knowledge that can be rapidly read, reviewed or searched. Vast archives of important data that might otherwise remain inaccessible are available for instant review no matter where you are. This e-book format makes a great reference work and educational tool. There is no other reference book that is as convenient, comprehensive, thoroughly researched, and portable - everything you need to know, from renowned experts you trust. For over a quarter of a century, our news, educational, technical, scientific, and medical publications have made unique and valuable references accessible to all people. Our e-books put knowledge at your fingertips, and an expert in your pocket!

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