From Lab Bench to Fuel Pump: Policy Implications in the Development of Lignocellulosic Biofuels

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This paper examines how information flows at key choice junctures can either integrate or isolate decisions in a hierarchical system. In particular, we study how decisions by the US Congress, setting biomass fuel targets in response to a call by President George Bush in his 2007 State of the Union address, placed in motion a cascade of decisions ultimately culminating with scientists in laboratories choosing specific experimental targets and protocols. To do this, the authors joined elements of the "political" process, that is, the President's Bully Pulpit, coupled with legislative branch enablement, and executive branch implementation with the actual conduct of the science that would make reaching the targets possible.

This examination focuses on the Department of Energy's bioenergy research centers (BRCs). These centers are supporting DOE's evolving mission to create a biomass fuels sector that will help meet transportation energy needs by substituting lignocellulosic biofuels for traditional petroleum-based fuels and corn-based ethanol. The centers are implementing research plans intended to provide the science necessary to create a new biomass fuels sector by moving the practical availability of cellulosic biomass feedstocks from the laboratory to commercial development.

Our first perspective provides an overview of the context for key decisions based on published information describing the policy process, the translation of this process into the framing of the specific social, economic, and technical issues that require resolution, and the policy issues around the technology. This review takes us from the political birth of lignocellulosic feedstocks to the goals the DOE centers are set.

Our second perspective comes from individual interviews done especially for this study, with interviewees drawn from the Oak Ridge BioEnergy Science Center (BESC). The interviews were conducted within a group that included principal investigators, senior managers and administrative staff, such as technology transfer officers. Following an ethnographic analysis format, we compared the different decisions and considerations surrounding the creation of lignocellulosic biofuels, and how these choices and their social implications vary depending on different science and technology pathways.

This research's goal is to identify and understand how the linkages between the choices underlying the program's vision and goals affect the research organization and the practices of research conduct. This effectively lodges the specific activities of scientists within the larger context of political goals, the biofuels industry, and energy markets.

Scientists working toward cost-effective lignocellulosic ethanol have accomplished breakthroughs that only a few years ago were barely considered real let alone routinely deployed. However, they suffer some of the same frustrations that workers in other fields face. They understand the purpose of their work, but they often see their own interests being set aside in favor of larger goals. They have roughly the same understanding of the policy decisions that led to their work as the general public. They sometimes repeat negative clichés concerning government rules and regulations interfering with their activities. Yet, they recognize that regulatory changes need to be implemented, favoring the development of cellulosic ethanol over corn ethanol, for their efforts to reach commercial scales.