

Carbon/Greenhouse Gas Regulation and Biofuel Industry Development

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When assessing the impact of regulation on the biofuel industry, it is important to understand that the development of the industry to-date has been highly dependent upon Federal, and to a lesser extent, state renewable energy policies. As a result, policy modifications have the potential to cause great changes to the industry and the trajectory of its development.

I was asked to address whether potential Carbon/Greenhouse Gas (GHG) legislation will be effective and how it will impact the biofuels industry. While admittedly naive regarding the political process, it appears difficult to predict the outcome of the process underway to develop legislation regulating GHG emissions. Rather than speculate about the outcome of this process, I have focused my comments on issues related to how GHG regulations would impact the biofuels industry and, in particular, how these policies influence the potential expansion of the industry beyond its current capacity.

In general, four key factors led to a substantial increase in U.S. ethanol production. First, energy prices rose considerably making the production of ethanol more economically attractive. Second, the technology related to ethanol production from corn starch was well developed, understood, and scalable so that large ethanol production facilities could be constructed and the feedstock (corn) was widely available with good transportation and handling facilities in place. Third, Federal policies such as oxygenate regulations, the renewable fuels standard, and the volumetric ethanol excise tax credit provided additional economic incentives for expansion of ethanol production. Finally, lenders and investors were willing to provide the substantial amounts of capital required to grow the U.S. ethanol industry from less than 2 billion gallons in 2001 to over 9 billion gallons today.

The willingness of lenders to supply this capital is often an overlooked factor contributing to the rapid development of the industry. Were it not for the combination of the first three factors, it is highly unlikely that lenders would have supplied the capital necessary for industry development. In other words, in order for an industry to attract the capital necessary for large-scale development, the industry technology and economics must be well understood.

A key factor in bringing lenders to the table was the stability and clear economic incentives provided by Federal ethanol policies. These policies guaranteed that ethanol would find its way to the marketplace and provided a direct subsidy that enhanced economics. The policies were understandable and it was easy to predict how they would impact the economics of corn ethanol production. With almost all proposed GHG regulations this is not the case.

Although serious concerns have begun to be raised about the logic of applying life cycle analysis (LCA) to biofuel production,¹ it appears that “life-cycle” thinking has dominated how the public, and subsequently policy makers, have thought about the problem of reducing green house gas emissions. This framework has led to discussions related to the energy balance and carbon

¹ de Gorter, H. and D.R. Just. “Why Sustainability Standards for Biofuel Production Make Little Economic Sense.” Forthcoming Cato Institute Briefing Paper 113 (August 2009).

footprint of alternative forms of energy. The primary rationale behind this approach is that one does not want to incentivize alternatives that result in greater greenhouse gas emissions than fossil based fuels.

While the net result of LCA is easily communicated to the public, arriving at reasonable sets of assumptions required to generate parameters for the models and calculate the results are difficult at best. Worse yet, the results of LCA are highly dependent upon assumptions over which there is little agreement.^{2,3} One of the most obvious of these problems concerns indirect land use change associated with increased biofuel production. How modelers handle this issue has a tremendous impact on the results of LCA analyses and the conclusions that one would draw from these analyses. Unfortunately, from an academic viewpoint there is little consensus in how these issues should be handled or modeled. From a capital provider's perspective, the uncertainties associated with how the regulations will impact industry economics make biofuels a very risky business to lend to or invest in.

The potential uncertainty created by LCA-based approaches to industry regulation will make it very difficult for the industry to attract the capital necessary to expand beyond its current production levels. This is particularly true when one considers next generation biofuels such as cellulosic ethanol. Even if the Federal policies required to support a new industry were well understood, the industry faces a number of uncertainties that will make capital suppliers reluctant to provide the funding necessary to produce a significant amount of cellulosic ethanol.

As opposed to corn-based ethanol, second generation biofuels will almost certainly require substantially more capital, have far greater technological issues/uncertainties, require development of new infrastructure for handling cellulosic biomass, and in some cases, would require production of crops that are not widely cultivated. As a result, the total amount of uncertainty that capital suppliers face is likely far greater than could be tolerated in today's financial environment.

When combined with uncertainty over how the inputs and outputs of these ethanol production facilities would be treated under LCA-based greenhouse gas regulations, the likelihood of a rapid development of the industry is highly unlikely. To be clear, an alternative of making sound investment decisions based on poor, albeit understandable, public policy is clearly unacceptable. Therefore it is critical that policymakers work carefully to develop both sound and logical GHG policies in order to achieve a proper allocation of capital.

While the ultimate structure of Federal regulation of Carbon/greenhouse gases is uncertain, the trend toward basing these regulations on LCA will likely slow development of the biofuel industry because lenders will be unwilling to lend into an industry whose economics are poorly understood. Further, because the economics are highly dependent on policy, they are essentially indeterminate until clarity is achieved over the conclusions of the LCA. It is possible that such regulations would ultimately be favorable to biofuel production, in which case the industry could resume its rapid growth, but the complications associated with LCA-based analyses make the resolution of this uncertainty unlikely in the near future.

² Rajagopol, D. and D. Zilberman. "The Use of Environmental Life-Cycle Analysis for Evaluating Biofuels."

³ Glauber, J. Statement to House Agriculture Committee, Subcommittee on Conservation, Credit, Energy, and Research.