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# How Green Economy Metrics Have Failed the Renewable Fuel Standard

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Emerging renewable energy policies such as the U.S. Renewable Fuel Standard (RFS), the E.U. Renewable Energy Directive (RED), and the California Low Carbon Fuel Standard (LCFS) require increasing amounts of biofuels in energy portfolios. USDA estimates that at least 527 biorefineries must be built in the U.S. to reach these goals, at a cost of $168 billion (1). In promoting its renewable energy agenda, the White House has touted not only the environmental benefits of biofuels, but also the energy security and rural development potential of a "green economy" (2). Such an economy "generates economic activity that preserves and enhances environmental quality while using natural resources more efficiently" (3). A backlash against the biofuels industry is mounting from myriad directions, however, including the "food versus fuel" debate and carbon accounting. Biofuels advocates fear the loss of public and Congressional support for the fledgling sector in the wake of conflicting messages. The threat of rising food and feed prices from this season's drought only will exacerbate biofuels advocates' uphill battle in the U.S. policy arena against grocers and cattlemen lobbies who object to rising costs of feedstocks, and NGOs concerned about food insecure countries that depend on imports.

Setting aside the argument that biofuels unfairly shoulder in the food security debate the burden of dysfunctional food distribution systems and inefficient dietary choices, supporters' best hope in the battle for funding and biofuels' public image is perhaps the potential for creating a green economy in rural America. The study of "greenness," as opposed to only generic economic development, is critical because "greenness" distinguishes and justifies bioenergy sector subsidies in an extreme climate of budget austerity and political polarity. Academia has failed to adequately develop a framework for evaluating what constitutes a "green" economy, including by what metrics it should be measured. Efforts are beginning, however, largely in response to looming bioenergy compliance requirements that for the first time seek to measure the economic and social benefits of environmental improvements within the broader meaning of "bio" fuels. Federal agencies such as DOE and DOD also appear keen to develop social impact metrics that tie to environmental achievements for project funding decisions, thus driving

demand by the private sector for standards that define their contributions to a “green” economy.

With regard to compliance, the E.U. RED in particular includes sustainability requirements to ensure that net environmental and social benefits of mandates are not lost. The U.S. RFS, while not requiring certification, instructs the Environmental Protection Agency (EPA) to assess the environmental impacts of biofuels every three years and report its findings to Congress. The RFS also requires the National Academies of Sciences to study social effects, but its 2011 study (4) unfortunately only generally reviews economic welfare and environmental impacts of the RFS. This lack of sophistication likely was due in no small part to the lack of research on integrative frameworks.

The creation of accurate and legitimate “green economy” metrics also is increasing in importance due to legislation requiring federal agencies use of impact statements in project funding and rulemaking decisions. DOE is required under the National Environmental Policy Act (NEPA) to assess both the environmental and social effects of federal project funding. Several environmental impact statements (EISs) have been prepared for biorefinery projects that address generally socio-economic impacts but do not tie environmental improvement to increased societal well-being (5). Earlier this year, DOE held a meeting to discuss development of more concrete social sustainability metrics that perhaps could guide future funding decisions for bioenergy projects. Participants emphasized that linkages between the environmental benefits of bioenergy and positive economic and social impacts in communities should be studied (6). While private certification standards such as the Council for Sustainable Biomass Production (CSBP) have made the most headway in developing framework metrics, the research community must provide the science to validate them.

While emerging standards consider individual elements of environmental and social sustainability of bioenergy projects to varying degrees, development of green economy metrics must improve on these nascent individualized metrics by integrating environmental impacts into calculations of socio-economic benefits within a biorefinery’s “shed of influence.” No public or private bioenergy-specific standard currently achieves this integration. This includes answering such questions as: how do biorefineries build intellectual capacity within a community by attracting and retaining a green-educated workforce? How do cellulosic cropping systems improve water quality, which in turn may reduce water purification costs for municipalities? How can improved habitat for animals and birds increase tourism and recreation opportunities? Do practices that sequester carbon enhance the income of farmers, which in turn is spent within the community?

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