

The Benefits of Biofuels: Is Science Mandated ?

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Abstract. Many studies have investigated the net energy balance of biofuel products (in terms of savings of fossil fuel) and have assessed how much greenhouse gases emissions was curtailed by substituting biofuels for fossil fuel. Many of these studies rely on life cycle analyses, but some of them include also a more systemic modeling approach of the indirect displacements of production and consumption. These studies give very different results and conclude that using biofuels results in savings of fossil fuel that range from very large to negative. We start from a large sample of technico-economic studies and we attempt to unravel the determinants of the main findings in terms of net energy value. Our approach relies on descriptive statistics and econometric estimates of the effects of various potential determinants across studies. We use statistical decomposition techniques derived from meta-analysis. Estimates suggest that the large variability across studies can be explained by the degree in which particular inputs (nitrogen, diesel, coal, etc.) are controlled for and the way consumption of fossil energy is allocated to the various co-products

Our results suggest that biofuels do have a positive energy value, but they show that LCA results are largely determined by a limited set of key assumptions, namely on the valorization of coproducts, the allocation of fossil energy consumption across joint products, and the level of inputs used in the agricultural production phase. In addition, the various assumptions and coefficients chosen within a range of plausible values are not independent across explanatory variables. This raises the possibility that the LCA results be largely affected by an "author" effect, if not by institutional factors. The literature on mandated science offers a means to tackle this issue. Hence, we address this question by studying how some characteristics relative to the author's affiliation (e.g. agriculture, environment or energy department) or the way the research has been conducted (the fundings, the acknowledgments, etc.) might explain the NEV. Our first results suggest that the author's affiliation strongly affects the sign and magnitude of NEV.