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Net Energy Analysis of Vermont Biodiesel  
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Abstract

Biodiesel is a fuel that can be produced from vegetable oil or animal fat. It can be used in compression ignition engines as a substitute for petrodiesel. Biodiesel has several advantages over petrodiesel, including the fact that it can be produced domestically from renewable resources and that it has lower emissions than petrodiesel for most pollutants. Given these advantages, it is important to consider biodiesel's efficiency as an energy source: how much energy is required to produce biodiesel, and how much energy is produced. The question may be phrased in terms of "energy return on energy invested" (EROI or EROEI), fossil energy ratio, net energy, and input-output analysis, but the underlying issues remain the same. Prior efforts to calculate the fossil energy ratio of biodiesel reflect significant differences in methodology and assumptions, and correspondingly significant difference in results. The differences lie primarily in the boundaries drawn around the inputs and the treatment of co-products or by-products. The prior efforts also rely on data that is out of date. This paper evaluates the differing methodologies, synthesizes the most sound approaches, and uses the resulting framework in conjunction with data from Vermont farms where biodiesel feedstocks are being grown in order to evaluate the potential for producing biodiesel in Vermont. Preliminary data and analysis indicate that fossil energy ratio for Vermont biodiesel is between 1.2 and 4.0, which compares reasonably well to biodiesel from other regions and to other renewable energy sources in general.