

Producing Biodiesel in Tennessee

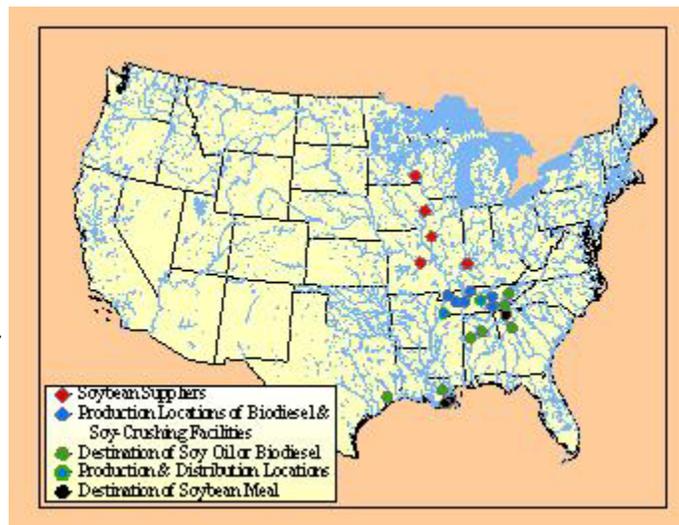
Objective: Evaluate the feasibility of a biodiesel processing facility located in Tennessee.

Methods: Examine the market situation and outlook of biodiesel, soybeans, oilmeal, and other byproducts, determine the costs of constructing and operating a biodiesel facility, and evaluate economic feasibility of placing the facility in several alternative Tennessee locations.

Results: Although current U.S. capacity lies at about 70 million gallons, biodiesel production is projected to rise dramatically in the next decade. Projections are that 100 to 500 million gallons will be used depending on future policies. Biodiesel prices are projected in the \$1.30 to \$1.60 range over the next decade.

Biodiesel use (to a 1% national blend) is projected to put upward pressure on soybeans and soybean oil prices and downward pressure on soybean meal and glycerine prices. In the next decade, prices of soybean are projected to rise to about \$6.33/bushel about 3% above what they would be without the biodiesel production. Soybean oil

prices are projected to rise as high as 13% above what they would be without the 1% national blend. Soybean meal prices are projected to be about 5% below what they would be without the national blend. Prices for glycerine will likely decline with large-scale development of biodiesel markets, with prices declining by a projected 20 to 30% to about 44 cents per pound by 2010.



The Senate Energy Bill passed in April would require the use of 2.3 billion gallons of renewable fuels in 2004. The requirement would increase to 5 billion gallons by 2012. Tax credits would be available to producers of biodiesel mixtures. The biodiesel mixture credit is 1 cent for each whole percentage point not exceeding 20 percentage points. The credits for alternative fueled vehicles would be expanded from 50 percent of the fleet to 100 percent of the fleet (model years 2002-2005). Title IX of the 2002 Farm Bill reauthorizes the Bioenergy Program and broadens the list of eligible feedstocks to include animal

byproducts and fat, oils, and greases (including recycled fats, oils, and greases). The Secretary is required to use up to \$150 million annually for FY 2003-06. In addition, EPA rulings limiting the amount of sulfur in highway diesel fuel by 2006 will likely put positive pressure on biodiesel markets.

Biodiesel production is most efficient at the level of 10-15 million gallons per year. A 13 million gallon facility would use 12,900,000 gallons of soybean oil. Costs of the project would be about \$18.8 million for a stand-alone facility. If an integrated facility were constructed that would incorporate crushing of soybeans into soybean oil, the project costs would be about \$37.6 million. About 9,000,000 bushels of soybeans would be required. Pro forma financial projections over a ten-year horizon are used to calculate returns to producers for each type of facility under baseline, best, and worst case scenarios. For the best and worst case scenarios the relevant prices are adjusted by their historical coefficients of variation. In the worst case scenarios tax credits are also removed from the analysis. For a stand-alone facility over the ten-year horizon, the internal rates of return under a baseline, best, and worst case are 36%, 103%, and negative. For the integrated facility over the ten-year horizon, the internal rates of return under a baseline, best, and worst case are 25%, 108%, and negative. For the stand-alone facility in the baseline case, the cumulative present values of the cash flows become positive in year 3, while this value becomes positive in year 5 of the integrated facility. Positive returns in the baseline case for both types of facilities are contingent on the availability of Blender's credits. In each case, it is assumed that producers provide 50% of the equity for the projects.

Several potential locations in West and Middle Tennessee were examined for locating biodiesel production facilities. Of these locations, Cates Landing appeared to be most favorable in terms of access to soybeans and for transportation costs. Cates Landing also appeared to have adequate access to livestock production to serve as a demand for soybean meal. A favorable location for a stand-alone facility processing oil into biodiesel is also Jasper, because of its proximity to population centers and to river transportation. However, for potential locations outside the West Tennessee area, integrated facilities would not have sufficient access to adequate supplies of soybeans for processing into oil. Close proximity to soybean production to make trucking transportation costs viable and barge access to more distant markets for biodiesel and byproducts are important factors in location selection.