Appendix B: MODEL DESCRIPTION

A stochastic simulation model was used to evaluate and compare the implications of the options for producing gasohol and modifying current commodity programs on economic variables characterizing U.S. corn and soybean markets, FEEDSIM, a model of U.S. corn and soybean markets is comprised of annual production, demand, and government program components, and incorporates interaction in supply and demand for both commodities. Because FEEDSIM is documented in detail elsewhere, only those modifications that were necessary to address the gasohol policy options are discussed here. Those modifications include incorporating: 1) the commitment by CCC to supply grain to alcohol distillers, 2) the subsidy needed to make alcohol production competitive, and 3) the impacts on soybean demand resulting from increased supplies of distillers dried grain.

The gasohol program alternatives analyzed here require a corn supply commitment equivalent to that needed to produce 1, 2, 3, or 4 billion gal of alcohol — 385,769, 1,154, and 1,538 million bu of corn, respectively. These amounts can be compared to the 460 million bu of corn that a previous study estimated could have been produced on corn acreage withdrawn from production in 1978.

The alternative levels of supply commitment are purchased and sold by CCC. This modification is incorporated in the stocks component of the model by specifying that CCC make available that amount of grain from either inventories accumulated through nonrecourse loan defaults or purchases from the market, which equal the difference between the levels of supply commitment and quantity defaulted. CCC is charged the loan rate for grain withdrawn from inventories and the market price for grain purchased from the market.

The per bushel corn price used to calculate CCC revenues is that required to make gasohol competitive with gasoline—$0.75/gal in 1979. This amount is increased 10 percent annually in following years to reflect rising gasoline prices. The subsidy for gasohol production is equal to the difference between the average price CCC is charged for the grain supply commitment and the price for grain that makes gasohol production competitive.

The process of grain to alcohol conversion also results in the production of distillers dried grain — a protein source that substitutes for soybean meal at a rate of 2 to 1. Each bushel of grain used in gasohol production reduces domestic soybean demand by 0.19 bu.

1) Distillers dried grain requires additional processing from the corn slurry. It is highly competitive with soybean meal and more transportable than the corn slurry.

2) Modifications incorporated in the model specify full utilization of the distillers grain—protein substitute for soybean meal. While this is not true, the model is used here as an example to illustrate the most severe case; i.e., that some of the distillers grain may be sold and wet is assumed to substitute to the extent that they or substitution has occurred, soybean demand would be depleted to less than the net reduction in processing from other feedgrains and other sources of adjustment that may be long term. This implies the reduced demand 1 week's output by all distillers to better serve supply and demand conditions.

115 Hollander and Ronald T. Meek. hot FEEDSIM Description and Computer Program Documentation. Agricultural Experiment Station. Purdue University. Sta Hub No. 221. March 1979.

Barbee et al. The Potential of Producing Energy from Agriculture. Iowa State University. 1979. The model incorporated in the model is designed for research purposes only. The results shown here should not be considered as confirmation. Other limitations of the model include: the exclusion of consumption response from other feedgrains and other sources of adjustment that may be long term; i.e., the reduced demand 1 week's output by all distillers to better serve supply and demand conditions.