

## **IPEP Project Review—April 18 & 19, 2005: Overall Points to Address**

**Goal:** Assess the technical, economic, and environmental feasibility of an integrated poultry and ethanol production (IPEP) system in north Alabama that uses poultry litter as an alternative source of process energy for ethanol production from corn

**Objectives:**

- Determine the feasibility of an IPEP poultry litter energy plant in north Alabama and compare its feasibility with that of other alternative uses of poultry litter
- Determine the feasibility of an IPEP corn/ethanol plant in north Alabama and compare its feasibility with that of traditional stand-alone corn/ethanol plants in the Midwest

**Major Accomplishments/Achievements to Date**

- A poultry litter combustion and steam generation system, including poultry litter and ash handling and storage, has been identified that is technically feasible and can comply with atmospheric emissions standards. Conceptual designs and cost estimates for this system indicate that process steam can be provided to a corn/ethanol plant at a natural gas equivalent price of \$3.50 to \$4.50/MBtu, assuming poultry litter prices and ash revenues discussed below; this price range is very competitive with natural gas prices that are projected to average more than \$6.00/MBtu over the next 15 years.
- Potential poultry litter supplies and a range of delivered prices have been estimated, recognizing that the level of enforcement of rules for land application of poultry litter will affect the availability and price of poultry litter provided to a centralized poultry litter energy plant. With enforcement of current rules, it is projected that poultry litter can be provided to an IPEP project for poultry litter cleanout and transportation costs which range from about \$8.00 to 12.00/ton of poultry litter.
- Poultry litter ash was evaluated as a replacement for traditional sources of mineral phosphorus and calcium supplements for broilers. Compared with dicalcium phosphate and calcium carbonate, poultry litter ash gave comparable growth, feed efficiency, and dressing performance. The dioxin levels in the poultry litter ash were below the World Health Organization standard for mineral supplements; however, public perception about dioxin risks could limit the use of poultry litter ash for use as a mineral feed supplement. It was estimated that a poultry litter energy plant can net from \$80 to 110/ton of ash, if dioxins are not a limiting factor for feeding the ash.
- Factors have been identified that affect the potential value of poultry litter ash for use in fertilizers and as a mineral feed supplement for broilers. Options for incorporating poultry litter ash into granular fertilizers have been identified. It was estimated that a poultry litter energy plant can net \$40.00 to 80.00/ton of ash used in fertilizers.
- An IPEP corn/ethanol plant on the Tennessee River in north Alabama was determined to be very competitive with traditional stand-alone corn/ethanol plants in the Midwestern US. The main tradeoffs relative to a Pekin, IL plant are that higher revenues for dried distillers grain and solubles and carbon dioxide at an IPEP plant roughly offset the higher cost of corn and that an IPEP plant saves \$0.10 to 0.15/gallon of denatured ethanol on process energy costs and an average of about \$0.04/gallon on ethanol transportation costs to southeastern and eastern US markets. A 15-year internal rate of return of 20 to 25% is projected for an IPEP corn/ethanol plant in north Alabama, assuming a 15-year average rack ethanol price of \$1.40/denatured gallon and the above assumptions for the poultry litter energy plant.

### **Project Work Remaining to be Completed**

- Life-cycle energy and greenhouse gas analyses for IPEP corn/ethanol production
- Comparing the feasibility of an IPEP poultry litter energy plant in north Alabama with the feasibility of other alternative uses for poultry litter from north Alabama
- Final details on balance of plant for the poultry litter energy system and logistical considerations for poultry litter supplies
- Adding detail to the narrative report for each main task and integrating the individual reports into a final report

### **Unresolved Problems/Obstacles That May Affect Project Goals/Impact**

- No significant obstacles have been identified that are expected to prevent achieving the project goal and objectives.
- A key expected impact is that information from this project will be used by a commercial entity to facilitate commercialization of an IPEP project in north Alabama.
  - A possible obstacle to this outcome is that current nutrient management rules may not be enforced in the near future, in which case sufficient poultry litter may not be available at a low enough price to develop a commercial IPEP project in north Alabama.
  - Another possible obstacle to the expected commercial impact is that a “not in my back yard” mentality could prevent commercialization of the IPEP concept.