

**STAFF SUMMARY**  
**Application for Certification of**  
**Corn Ethanol / Dry Mill/ with Residue Co-Products Credit LCFS Pathway**  
**Trestle Energy LLC**  
**Mason City, Iowa**  
**(ETHC116)**

Date Deemed Complete: December 7, 2015  
Date Posted: December 18, 2015  
Date Certified: December 30, 2015

### **Pathway Summary**

Located in La Jolla, CA, Trestle Energy LLC, a development firm committed to developing low carbon production systems, proposes a corn ethanol pathway with residue co-products (CERC) of less than 50% of available agricultural residues. Trestle has applied for one Method 2B pathway under the California Low Carbon Fuel Standard (LCFS). System expansion accounting methods are applied for the emissions consequences of CERC for emissions credits. In the proposed feedstock supply system, the utilization of corn stover agricultural residues reduces biofuel carbon intensity by removing biomass from farm fields and processing it into biofuel co-products used at power plants to generate electricity. The proposed CERC pathway incorporates co-products to directly reduce biogenic emissions and displace fossil fuel combustion at power plants. Trestle has worked with Golden Grain Energy – a dry mill corn ethanol plant located in Mason city, Iowa - to demonstrate a carbon intensity reduction by utilizing the proprietary residue co-product supply system. The CI impact of the CERC pathway is added to Golden Grain Energy's existing ethanol pathway CI in order to obtain the overall CI of the combined systems. This practice could be applied to other corn ethanol plants provided that Trestle can establish supply chain traceability for stover used for electricity generation, and subject to the operating conditions and limits described in this Summary.

### **Carbon Intensity (CI) Impact of the Trestle Pathway**

The applicant requests one CERC pathway that requires changes to biofuel feedstock supply chain, including additional use of farm equipment for stover removal, additional chemical inputs to offset nutrients removed with the stover, and additional use of transport equipment to haul stover away from feedstock-producing fields. Other changes outside of the agricultural sector involve processing of agricultural residues into solid fuel co-products, delivery of solid fuel co-products, and co-product utilization to directly displace fossil fuel consumption. For the CI impact calculation, the applicant introduced several user-defined parameters and provided some parameters that are not available in the CA-GREET1.8b model, including both pre- and post- processing residue

transport distances, residue utilization rate, energy use from residue collection and processing, and efficiency penalty for residue utilized at power plants. Using the parameters included in the LCA report, the applicant modified the CA-GREET model and calculated a CI of -18.01 gCO<sub>2</sub>e/MJ for the proposed CERC pathway.

The proposed CI impact result has been evaluated against the carbon intensity constraint suggested by ARB staff that the CI reduction (credit) achieved by the CERC system should be not greater than the reduction that would be achieved by using the solid fuel co-product to meet thermal energy requirements of the Golden Grain Energy ethanol production facility. Using Golden Grain Energy facility energy use data (Confidential Business Information), staff determined that the proposed CERC pathway is consistent with the proposed CI reduction limit. The production and utilization of residue co-products reduces the total CI to 70.65 gCO<sub>2</sub>e/MJ for the Golden Grain Energy pathway (ETHC083), with 100 percent Dry DGS.

Currently, the Golden Grain Energy facility has four corn-ethanol pathways. This pathway with residue co-products will be an additional pathway available only to volumes of ethanol which are otherwise eligible for registration under pathway code ETHC083 (subject to any applicable constraints of ETHC083).

### Proposed Lookup Table Entries

Fuel	Pathway Identifier	Pathway Description	Carbon Intensity Values (gCO <sub>2</sub> e/MJ)		
			Direct Emissions	Land Use and Other Indirect Effects	Total
Ethanol from Corn	ETHC116	2B Application*: Midwest; Dry Mill; Dry DGS; NG. Using corn residue co-products to generate credit for displaced fossil fuel.	40.65	30	70.65

\*Specific Conditions Apply

### Applicable Operating Conditions

Operations at the plant will be subject to the following operating conditions designed to ensure that the CI of the corn ethanol produced at the Golden Grain Energy plant will remain at or below the values appearing in the above table.

- The CERC pathway will be subject to periodic assessments of agricultural residue markets to detect whether agricultural residue use within the CERC pathway is competing with residue use as a cellulosic biofuel feedstock, and the

emission accounting for agricultural residue co-products within the CERC pathway may be revised if such competition is detected.

- Other residue processing methods (processed into pellets, cubes or briquettes) and types of process energy (diesel or electricity or the combination) may be used as long as the proposed CI impact reported in the above table is not exceeded.
- Average baled residue transport distance and post processed residue transport distance will not exceed the values specified in the application.
- Contracts establishing supply chain traceability are required for verification of corn stover utilization for electricity generation.
- The CERC pathway will be restricted to the corn ethanol plant only. No other biofuels will be considered.
- The stover utilization should not exceed 50% by mass per harvested acre.

### **Staff Analysis and Recommendations**

Staff has reviewed the Trestle Method 2B application and finds the following:

- Staff has replicated, using the CA-GREET spreadsheet, the carbon intensity reduction value calculated by the applicant;
- Staff has concluded that the CI reduction limitation with the Golden Grain Energy plant's actual thermal energy consumption is not likely to exceed the proposed CI reduction specified in Trestle Method 2B application.

On the basis of these findings, ARB staff recommends that Trestle application for the above Method 2B LCFS pathway with Golden Grain Energy Facility energy use data be approved for certification as a prospective pathway.

Fuels with prospective CIs are not eligible to claim credits under the LCFS under the readopted LCFS regulation, effective January 1, 2016. To claim provisional credits the applicant must provide one quarter of operational data once commercial production has commenced. ARB will then complete an updated lifecycle analysis and make necessary adjustments to the originally certified prospective CI if warranted and approve a provisional CI for each of the pathways being considered in this application. To confirm compliance with updated operating conditions, the Executive Officer may reevaluate any aspect of the review at any time and revise the certification to reflect new information. At any time after certification, the Executive Officer may increase the

CI values upon a determination that the provisional CIs underestimate fuel life carbon intensity. (Cal. Code Regs. tit. 17, § 95486, subd. (e)(3)(K) (original LCFS); Cal. Code Regs. tit. 17, § 95488, subd. (c)(5)(L) (beginning January 1, 2016).)