

Fuel Pathway Staff Summary Western Plains Energy, LLC

Plant Summary

Western Plains Energy, LLC (WPE) produces ethanol from corn and grain sorghum at a dry mill plant in Oakley, Kansas. The plant has applied for six Method 2A pathways (three corn and three sorghum pathways) under the California Low Carbon Fuel Standard (LCFS). The WPE plant is an ICM-designed facility with a nameplate capacity of 40 million gallons per year of denatured ethanol. According to the Class II Operating Permit issued by the Kansas Department of Health and Environment, the plant can produce up to 52 million gallons of denatured ethanol per rolling twelve-month period. Although the plant is natural-gas-fired, WPE intends to use natural gas only to dry its distiller's grains with soluble (DGS). It plans to provide thermal energy to its ethanol production processes with biogas. As shown in Table 1, the six pathways proposed by WPE are differentiated by feedstock and the proportion of total DGS that is dried. For each feedstock, the same three dry DGS proportions are specified: zero percent (100 percent wet DGS), four percent, and 40 percent. As more DGS is dried, more natural gas is used.

Carbon Intensity of Ethanol Produced

As shown in Table 1, WPE is applying for six Method 2A pathways with carbon intensities (CIs) ranging from 68.54 to 71.84 gCO₂e/MJ for corn and 66.31 to 69.61 gCO₂e/MJ for sorghum. Proposed Method 2A pathways must be evaluated against reference pathways from the LCFS Lookup table. Although a Method 2A pathway must be very similar to its reference pathway, it must achieve at least a five gram CO₂e/MJ CI improvement over that pathway.¹ The reference pathways for WPE's corn pathways are pathways ETHC008 and ETHC004 (Midwest dry mill, natural gas, wet and dry DGS pathways, respectively). The reference pathways for WPE's sorghum pathways are pathways ETHG002 and ETHG001 (Midwest dry mill, natural gas, wet and dry DGS pathways, respectively). All of WPE's proposed pathways improve upon their reference pathways by more than the requisite five grams of CO₂e/MJ.

This CI improvement was made possible by the high use of biogas in the production plant and by the plant's efficient design. ICM Inc. designed the WPE plant to achieve reductions in both thermal and electrical energy consumption. As a result, it improves upon both the thermal and electrical energy consumption levels assumed for the reference pathways (thermal energy use of 22,430 and 32,300 BTU per gallon for the wet and dry DGS pathways, respectively; electrical energy use of 1.08 kW-hr per gallon for the both the wet and dry DGS pathways).²

¹ In the LCFS regulation, this 5 gCO₂e/MJ threshold is referred to as a "substantiality requirement."

² Actual WPE plant energy use values are classified as confidential business information and not reported herein.

Table 1: Proposed Lookup Table Entries

| | Pathway Identifier | Pathway Description | Carbon Intensity in gCO ₂ e/MJ (Including Indirect Effects) | | |
|---------|--------------------|--|--|-----------------------------------|-------|
| | | | Direct Emission | Land Use or Other Indirect Effect | Total |
| Ethanol | ETHC073 | 2A Application*: Ethanol from 100% Corn, Dry mill, 100% biogas, 100% Wet DGS | 38.54 | 30 | 68.54 |
| Ethanol | ETHC074 | 2A Application*: Ethanol from 100% Corn, Dry mill, over 97% biogas, 4% Dry DGS | 38.90 | 30 | 68.90 |
| Ethanol | ETHC075 | 2A Application*: Ethanol from 100% Corn, Dry mill, over 80% biogas, 40% Dry DGS | 41.84 | 30 | 71.84 |
| Ethanol | ETHG005 | 2A Application*: Ethanol from 100% Sorghum, Dry mill, 100% biogas, 100% Wet DGS | 36.31 | 30 | 66.31 |
| Ethanol | ETHG006 | 2A Application*: Ethanol from 100% Sorghum, Dry mill, over 97% biogas, 4% Dry DGS | 36.67 | 30 | 66.67 |
| Ethanol | ETHG007 | 2A Application*: Ethanol from 100% Sorghum, Dry mill, over 80% biogas, 40% Dry DGS | 39.61 | 30 | 69.61 |

*Specific conditions apply

Operating Conditions– Western Plains Energy, LLC (Western Plains, KS)

The following will become operating conditions for the WPE fuel pathways upon approval by the Executive Officer:

- According to the WPE application, the biogas processing plant is scheduled to start up before the end of the current calendar year and be fully operational by the end of February 2013. WPE’s estimates of the relative proportions of electricity, natural gas, and biogas that will be consumed by the digester plant are based on:
 - The expected energy demands of the two glycol boilers; and

- The theoretical operating load and the connected load of the electrical motors in the digester plant.

The energy consumption and GHG emissions associated with the production of biogas at the WPE plant were estimated prospectively in WPE's application. In order to confirm those estimates, WPE will submit copies of all energy purchase invoices for the facility. Submission will continue until ARB is in receipt of invoices covering two consecutive years of operation. If the digester plant's actual energy consumption proves to be significantly higher than the estimates on which WPE's pathway CIs are based, the affected CIs will be recalculated based on the plant's actual energy consumption, and the new CIs will be applied retroactively to all WPE sales reported in the LCFS Reporting Tool.

- WPE's pathway CIs are based on corn and sorghum ethanol yields that are different from the default yield values on which the LCFS reference pathways are based.³ The staff approval granted in this document shall apply only to ethanol produced at yields that are equal to or higher than those used to calculate the WPE CIs. Should the production yield fall below the values used in its application, WPE shall not sell in California the ethanol associated with the LCFS pathways values appearing in Table 1.
- The total pathway-specific thermal and electrical energy use values (inclusive of both bio- and natural gas) reported in the WPE Method 2A application shall not be exceeded. These values are classified by the applicant as confidential business information. Pathway-specific energy use values may be calculated using any accounting period up to and including one year.
- The staff approval granted in this document extends to ethanol production associated with 100 percent wet DGS and up to 40 percent dry DGS. The 100 percent wet DGS CI shall only be applied to ethanol volumes produced when no DGS drying occurs. The four percent dry DGS CI may be applied to volumes associated with the drying of up to four percent of the DGS produced (more than zero percent but less than or equal to four percent of the DGS produced is dried). The 40 percent DGS CI may be applied to volumes associated with drying more than four percent but less than or equal to 40 percent of the DGS produced. Volumes associated with the drying of more than 40 percent of the DGS produced may not be sold in California under the staff approvals granted herein. This operating condition applies equally to WPE's corn and sorghum pathways.

In order for WPE to sell ethanol in California under the CI appearing in Table 1, these four conditions must be met for every gallon sold.

Staff Analysis and Recommendation

Staff has reviewed the Western Plains Energy, LLC application and has replicated, using the CA-GREET spreadsheet, the carbon intensity values calculated by WPE. Western Plains Energy, LLC has provided documentation verifying the plant's natural gas and

³ WPE's ethanol yield values are classified as confidential business information and not reported herein

electrical energy use. The energy consumed by the biogas digester plant, was, however, estimated. Staff is satisfied that the energy values presented in the application accurately represent the plant's actual thermal and electrical energy consumption, and that WPE's digester plant energy consumption estimates are likely to be confirmed by operational data. Consequently, staff believes that the carbon intensity values appearing in Table 1 accurately represent the carbon intensity values of the ethanol produced (and to be produced) at the WPE plant. Staff therefore recommends that the WPE's application for a Method 2A corn ethanol pathway and sorghum ethanol pathway be approved.