

**Method 2B Pathway Application Summary:
White Energy Russell Plant—Sorghum/Waste Wheat Slurry/Corn Ethanol**

Plant Summary

White Energy operates an ethanol plant (Russell Plant) on a 60 acre industrial park near Russell, Kansas. Also occupying that park are a wheat gluten production plant, a wastewater treatment plant, a gas turbine electrical generation plant owned by the local utility company, and a pet food plant. The Russell plant produces 50 million gallons of ethanol and 125,000 tons of distiller's grains with solubles (DGS) annually. DGS is co-product that is used for animal feed. Depending upon market conditions, DGS from the Russell plant is sold as either dry, partially dry, or wet product. The partially dry product is known as "modified" DGS.

The Russell plant's primary feedstock is sorghum mixed with waste wheat slurry from the nearby wheat gluten plant. Corn is occasionally used in small amounts as a feedstock supplement. The Russell plant uses natural gas and electricity for its process power. The plant's electrical energy is supplied by the gas turbine facility with which it shares the local industrial park. Waste heat from the gas turbine generator powers a heat recovery boiler; the Russell plant obtains process steam from that unit. A majority of the ethanol produced at the Plant is sold into the California market.

Carbon Intensity of Ethanol Produced

The total carbon intensity of the ethanol produced by the Russell Plant consists of the carbon intensity associated with farming sorghum, agricultural chemical production, feedstock transportation, ethanol production, ethanol transportation and delivery, and co-products. White Energy is applying for 15 pathways; each pathway is defined by the proportion of wheat slurry in the plant's feedstock and by the type of DGS produced. Table 1, describes the 15 proposed pathways. Table 2 is an abbreviated version of Table 1 showing pathway carbon intensities by wheat slurry percentage and DGS type.

The land use change (LUC) impacts of using sorghum and wheat slurry for fuel feedstocks have not yet been estimated. Until the Board approves LUC values for these feedstocks, the corn value of 30 gCO₂e/MJ will be used on in interim basis.

Table 1: Proposed Lookup Table Entries

Fuel/Feedstock	Proposed Lookup Table Pathway Description	Carbon Intensity in gCO₂e/MJ (Including Indirect Effects)	Do Special Conditions Apply? (Y/N)¹
Ethanol/Sorghum, Wheat Slurry, Small Amounts of Corn	Midwest dry mill; 15% wheat slurry, sorghum, corn; NG; wet DGS	69.36	Y
Ethanol/Sorghum, Wheat Slurry, Small Amounts of Corn	Midwest dry mill; 15% wheat slurry, sorghum, corn; NG; dry DGS	77.66	Y
Ethanol/Sorghum, Wheat Slurry, Small Amounts of Corn	Midwest dry mill; 15% wheat slurry, sorghum, corn; NG; modified DGS	71.66	Y
Ethanol/Sorghum, Wheat Slurry, Small Amounts of Corn	Midwest dry mill; 20% wheat slurry, sorghum, corn; NG; wet DGS	66.16	Y
Ethanol/Sorghum, Wheat Slurry, Small Amounts of Corn	Midwest dry mill; 20% wheat slurry; sorghum, corn; NG; dry DGS	74.46	Y
Ethanol/Sorghum, Wheat Slurry, Small Amounts of Corn	Midwest dry mill; 20% wheat slurry, sorghum, corn; NG; modified DGS	68.46	Y
Ethanol/Sorghum, Wheat Slurry, Small Amounts of Corn	Midwest dry mill; 25% wheat slurry, sorghum, corn; NG; wet DGS	62.96	Y
Ethanol/Sorghum, Wheat Slurry, Small Amounts of Corn	Midwest dry mill; 25% wheat slurry, sorghum, corn; NG; dry DGS	71.26	Y
Ethanol/Sorghum, Wheat Slurry, Small Amounts of Corn	Midwest dry mill; 25% wheat slurry, sorghum, corn; NG modified DGS	65.26	Y
Ethanol/Sorghum, Wheat Slurry, Small Amounts of Corn	Midwest dry mill; 30% wheat slurry, sorghum, corn; NG; wet DGS	59.76	Y
Ethanol/Sorghum, Wheat Slurry, Small Amounts of Corn	Midwest dry mill; 30% wheat slurry, sorghum, corn; NG; dry DGS	68.06	Y

Fuel/Feedstock	Proposed Lookup Table Pathway Description	Carbon Intensity in gCO ₂ e/MJ (Including Indirect Effects)	Do Special Conditions Apply? (Y/N) ¹
Ethanol/Sorghum, Wheat Slurry, Small Amounts of Corn	Midwest dry mill; 30% wheat slurry, sorghum, corn; NG; modified DGS	62.06	Y
Ethanol/Sorghum, Wheat Slurry, Small Amounts of Corn	Midwest dry mill; 35% wheat slurry, sorghum, corn; NG; wet DGS	56.56	Y
Ethanol/Sorghum, Wheat Slurry, Small Amounts of Corn	Midwest dry mill; 35% wheat slurry, sorghum, corn; NG; dry DGS	64.86	Y
Ethanol/Sorghum, Wheat Slurry, Small Amounts of Corn	Midwest dry mill; 35% wheat slurry, sorghum, corn; NG; modified DGS	58.86	Y

¹ The special conditions to which this column refers are discussed in the "Carbon Intensity of the Fuel Produced" section of this summary

Table 2: Carbon Intensities (gCO₂e/MJ) of the Proposed Russell Plant Pathways (includes land use change increment of 30 gCO₂e/MJ)

	Wheat Slurry Fraction				
	15%	20%	25%	30%	35%
Wet DGS	69.36	66.16	62.96	59.76	56.56
Dry DG	77.66	74.46	71.26	68.06	64.86
Modified DGS	71.66	68.46	65.26	62.06	58.86

Because the current LCFS Lookup table contains no ethanol pathways for plants utilizing sorghum and wheat slurry, White Energy is applying for Method 2B approval for its Russell plant pathways. It is, therefore, not subject to the substantiality requirements with which Method 2A applications must comply.

The following will become operating conditions upon approval by the Executive Officer of White Energy's proposed Plainview plant pathways:

- Total energy and electricity use
- Corn-sorghum ratios in the plant's feed stock
- DGS moisture content

Actual plant performance in each of these areas shall remain within the bounds established in White's application. The plant's energy and electricity use values are classified by the applicant as confidential business information.

Staff Analysis and Recommendation

ARB staff has reviewed the White Energy's Russell Plant application and has replicated, using the CA-GREET spreadsheet, the carbon intensity values calculated by the applicant. White Energy provided documentation for the plant's energy usage and ethanol production volumes. Staff is satisfied that the energy consumption values provided by the applicant accurately represent the Russell Plant's actual energy usage. Staff believes that the carbon intensities specified by White Energy will be sustainable. Consequently, staff believes that the 15 pathway carbon intensities shown in Table 1, above, accurately reflect that plant's actual carbon intensities. Staff recommends, therefore, that the White Energy's application for 15 Method 2B ethanol pathways for its Russell Plant be approved.