

# Johnstown Regional Energy CA-GREET Model

The applicant has conducted its analysis of direct effects on carbon intensity for this pathway using CA-GREET, v.1.8b (Dec. 2009) (See [http://www.arb.ca.gov/fuels/lcfs/ca\\_greet1.8b\\_dec09.xls](http://www.arb.ca.gov/fuels/lcfs/ca_greet1.8b_dec09.xls)). The standard inputs and parameters specified in CA-GREET remain unchanged except as noted in the input table below. The input table below specifies the spreadsheet location of the CA-GREET inputs and other parameters that were claimed as confidential business information or trade secret by the applicant, but it does not disclose the actual value of such inputs and parameters because they are claimed to be confidential business information or trade secret.

Johnstown Regional Energy’s Input data table (Locations of cells containing Confidential Business Information (CBI) are shown, but the actual values of such confidential information are not disclosed):

Parameters	GREET model		Original GREET values	Company values	Note
	Tab	Cell			
Electricity Distribution mix	Regional LT	C2	U.S. Average	CBI	
Electricity Distribution mix	Regional LT	I83	0.0%	CBI	
Electricity Distribution mix	Regional LT	I84	35.6%	CBI	
Electricity Distribution mix	Regional LT	I85	54.9%	CBI	
Electricity Distribution mix	Regional LT	I86	0.0%	CBI	
Electricity Distribution mix	Regional LT	I87	6.1%	CBI	
Electricity Distribution mix	Regional LT	I88	3.4%	CBI	
Feedstock Source	Inputs	C72	1	CBI	
Energy input for LFG recovery	Fuel_Prod_TS	L35	4621.25	CBI	
Distance LFG collection to	Inputs	L74	1	CBI	

processing					
LFG recovery energy efficiency	Fuel_Prod_TS	K35	99.5%	CBI	
LFG processing energy efficiency	Fuel_Prod_TS	AQ35	82.7%	CBI	
NG share in LFG processing	NG	AI75	68.6%	CBI	
Electricity share in LFG processing	NG	AI79	31.4%	CBI	
Landfill gas LHV	Fuel_Specs	C49	446	CBI	
Landfill gas density	Fuel_Specs	E49	34.54	CBI	
Distance from NG plant to CNG refueling station	T&D_Flowcharts	F459	750	CBI	
Distance from Landfill plant to CNG refueling station	T&D_Flowcharts	F479	50	CBI	

JRE also made changes to few mathematical formulas in the GREET model in order to customize it for landfill gas to CNG process.

Parameters	GREET model		Original GREET formula	Modified formula
	Tab	Cell		
Electricity used for LFG processing	NG	L91	=1000000*(1/L\$66-1)*L79	CBI
Total VOC emissions during LFG processing (grams/ mmBtu of fuel throughput)	NG	AI99	Old formula had these cells: E\$47, E\$48, E\$49, E\$50, E\$53, E\$54, E\$55, E\$56	CBI
Total CO emissions during LFG processing (grams/ mmBtu of fuel throughput)	NG	AI100	Old formula had these cells: E\$47, E\$48, E\$49, E\$50, E\$53, E\$54, E\$55, E\$56	CBI
Total CH4 emissions during LFG processing (grams/ mmBtu of fuel throughput)	NG	AI105	Old formula had these cells: E\$47, E\$48, E\$49, E\$50, E\$53, E\$54, E\$55, E\$56, \$O105, O108	CBI
Total N2O emissions during LFG processing (grams/ mmBtu of fuel throughput)	NG	AI106	Old formula had these cells: E\$47, E\$48, E\$49, E\$50, E\$53, E\$54, E\$55, E\$56	CBI

Total CO2 emissions during LFG processing (grams/ mmBtu of fuel throughput)	NG	AI107	Old formula had these cells: E\$47, E\$48, E\$49, E\$50, E\$53, E\$54, E\$55, E\$56	CBI
Distance LFG collection to refueling station via pipeline	T&D	BR93	=T&D_Flowcharts!AE458	CBI
Total energy spent in transporting LFG to refueling station via pipeline	T&D	BR111	Part of formula that was changed Fuel_Specs!\$B\$45* Fuel_Specs!\$E\$45	CBI
Total VOC emissions during LFG transport (grams/ mmBtu of fuel throughput)	T&D	BR117	Part of formula that was changed Fuel_Specs!\$B\$45* Fuel_Specs!\$E\$45	CBI
Total CO emissions during LFG transport (grams/ mmBtu of fuel throughput)	T&D	BR118	Part of formula that was changed Fuel_Specs!\$B\$45* Fuel_Specs!\$E\$45	CBI
Total CH4 emissions during LFG transport (grams/ mmBtu of fuel throughput)	T&D	BR123	Part of formula that was changed Fuel_Specs!\$B\$45* Fuel_Specs!\$E\$45	CBI
Total N2O emissions during LFG transport (grams/ mmBtu of fuel throughput)	T&D	BR124	Part of formula that was changed Fuel_Specs!\$B\$45* Fuel_Specs!\$E\$45	CBI
Total CO2 emissions during LFG transport (grams/ mmBtu of fuel throughput)	T&D	BR125	Part of formula that was changed Fuel_Specs!\$B\$45* Fuel_Specs!\$E\$45	CBI