

## LCFS Illustrative Fuel Pathway Carbon Intensity

Determined using CA-GREET2.0

The following table shows full fuel cycle carbon intensity (CI) scores for representative fuel pathways calculated using [CA-GREET 2.0](#). These values are presented for discussion purposes only, will not be used for any regulatory purpose (unless a similar value is contained in the [LCFS rulemaking](#) itself), and are not based on any individual producer's parameters.

Under the proposed LCFS regulation, alternative fuel providers will submit data specific to each individual operation and supply chain ("pathway") in order to determine their actual CI. Furthermore, the values shown below should not be understood or used as average or typical CI results, but rather are intended to loosely illustrate the expected ordinal ranking of various fuel CIs.

Fuels		Carbon Intensity			
		Direct CI, gCO <sub>2</sub> <sub>e</sub> /MJ	ILUC, gCO <sub>2</sub> <sub>e</sub> /MJ	Total CI, gCO <sub>2</sub> <sub>e</sub> /MJ	EER- Adjusted CI, gCO <sub>2</sub> <sub>e</sub> /MJ <sub>baseline fuel</sub>
Baseline Fuels	CARBOB	99.78		99.78	99.78
	ULSD	102.01		102.01	102.01
	CaRFG	98.47		98.47	98.47
Natural Gas	North American NG - CNG	78.36		78.36	87.07
	North American NG - LNG (90% liquefaction eff.)	84.55		84.55	93.95
Biomethane	Landfill Gas - CNG	18.11		18.11	20.12
	Landfill Gas - LNG (80% liquefaction eff.)	34.23		34.23	38.04
	Landfill Gas - LNG (90% liquefaction eff.)	23.61		23.61	26.24
	Landfill Gas - L-CNG	36.78		36.78	40.87

Fuels		Direct Cl, gCO <sub>2</sub> <sub>e</sub> /MJ	ILUC, gCO <sub>2</sub> <sub>e</sub> /MJ	Total Cl, gCO <sub>2</sub> <sub>e</sub> /MJ	EER- Adjusted Cl, gCO <sub>2</sub> <sub>e</sub> /MJ <sub>baseline fuel</sub>
Biodiesel	Soybean Biodiesel	22.94	29.1	52.04	52.04
	Tallow Biodiesel	31.30		31.30	31.30
	UCO Biodiesel	19.11		19.11	19.11
	Canola Biodiesel	39.55	14.5	54.05	54.05
	Corn Oil Biodiesel (from Wet DGS)	30.57		30.57	30.57
Renewable Diesel	Soybean Renewable Diesel (RD)	20.78	29.1	49.88	49.88
	Tallow RD	28.41		28.41	28.41
	UCO RD	17.29		17.29	17.29
	Canola RD	34.09	14.5	48.59	48.59
	Corn Oil RD (from Wet DGS)	28.64		28.64	28.64
Sugarcane Ethanol	Sugarcane EtOH				
	1. Base Case, no credit, (ETHS001)	39.53	11.8	51.33	51.33
	2. Mechanized and Power Export (ETHS002)	28.67	11.8	40.47	40.47
	3. Mechanized Harvesting only	29.84	11.8	41.64	41.64
	4. Power Export only (ETHS003)	38.36	11.8	50.16	50.16
Sorghum Ethanol	Grain Sorghum EtOH (from MW, 100% NG) (ETHG001)	63.62	19.4	83.02	83.02
Corn Ethanol	Corn Ethanol (Midwest Corn EtOH, 100% NG) (ETHC004)	57.72	19.8	77.52	77.52

Fuels		Direct Cl, gCO <sub>2</sub> <sub>e</sub> /MJ	ILUC, gCO <sub>2</sub> <sub>e</sub> /MJ	Total Cl, gCO <sub>2</sub> <sub>e</sub> /MJ	EER- Adjusted Cl, gCO <sub>2</sub> <sub>e</sub> /MJ <sub>baseline fuel</sub>
Hydrogen	Gaseous Hydrogen from central reforming of NA-NG (with liquefaction and re-gas steps) (HYGN001)	151.01		151.01	60.40
	Liquid Hydrogen from central reforming of NA-NG (HYGN002)	143.51		143.51	57.40
	Gaseous Hydrogen from central reforming of NA-NG (without liquefaction and re-gas step) (HYGN003)	105.65		105.65	42.26
	Gaseous Hydrogen from on-site reforming of NA-NG (without liquefaction and re-gas steps) (HYGN004)	105.13		105.13	42.05
	Gaseous Hydrogen from on-site reforming of 2/3 NA-NG and 1/3 RNG (HYGN005)	88.33		88.33	35.33
Electricity	Average California Electricity (ELC001)	105.16		105.16	30.95
Anaerobic Digestion	Biomethane from the mesophilic anaerobic digestion of wastewater sludge at a wastewater treatment plant (WWTP) located at a publicly-owned treatment works (POTW) to CNG (Small to Medium) (CNG021)	30.92		30.92	34.36
	Biomethane from the mesophilic anaerobic digestion of wastewater sludge at a wastewater treatment plant (WWTP) located at a publicly-owned treatment works (POTW) to CNG (Medium to Large) (CNG020)	7.75		7.75	8.61