

Table S1. GREET land-use parameters

GREET Parameter	Value
Select Corn Ethanol Case	Corn Ethanol 2011
Select Domestic Emissions Modeling Scenario	Century
Select International Emissions Modeling Scenario	Winrock
Domestic Emissions Modeling Scenario	yield increase
Soil depth considered in modeling	100 cm
Harvested Wood Product (HWP) Scenario	HEATH
Tillage Practice for Corn and Corn Stover Production	Conventional Till
Forest Prorating Factor	Yes

Table S2. Transportation modes and distances for selected products.

Source	Destination	Mode	Distance (km)	Component or Commodity
Japan Case Study				
Middle East	Japan	Ocean Going Vessel	12000	Gasoline BOB
US Gulf Coast	Japan	Ocean Going Vessel	16000	ETBE, EtOH
US Midwest	US Gulf Coast	Barge	2300	EtOH
Brazil	US Gulf Coast	Ocean Going Vessel	8000	EtOH for ETBE
Japan	Japan	Truck	10	E10
Japan	Japan	Pipeline	10	ETBE blend
Colombia Case Study				
US Gulf Coast	Colombia	Ocean Going Vessel	3000	BOBs, ETBE, US Ethanol
US Midwest	US Gulf Coast	Barge	2300	EtOH for ETBE
Cali, Colombia	US Gulf Coast	Ocean Going Vessel	3000	EtOH for ETBE
Cali, Colombia	Colombia	Truck	550	EtOH
Colombia	Colombia	Truck	10	Finished (oxygenated) gasolines
Europe Case Study				
Middle East	France	Ocean Going Vessel	8100	Gasoline BOB
France	France	Truck	50	E10, ETBE

Table S5. Composition of modeled fuel blends for France 95 RON

Oxygen Wt %:	0	3.7%			5.2%				6.9%					8.0%					
Blend:	E0	E10	E5ETB E12	ETBE24	E15	E10ETB E11	E5ETB E22	ETBE33	E20	E15ETB E11	E10ETB E22	E5ETB E33	ETBE44	E23	E20ETB E7	E15ETB E18	E10ETB E29	E5ETB E40	ETBE51
Reformate %	62.3%	36.4%	29.4%	23.2%	30.8%	24.6%	18.3%	12.1%	24.4%	18.2%	12.0%	5.7%	6.3%	20.6%	16.9%	10.7%	4.4%	4.9%	0.1%
Naphtha %	1.4%	3.7%	7.6%	11.1%	7.4%	10.8%	14.4%	17.9%	11.5%	15.0%	18.5%	22.0%	29.1%	14.0%	16.0%	19.5%	23.1%	30.1%	34.4%
Other Gas %	36.4%	49.3%	45.5%	42.2%	46.9%	43.5%	40.2%	36.8%	44.1%	40.8%	37.4%	34.0%	20.2%	42.4%	40.5%	37.1%	33.7%	20.0%	14.5%
ETBE %	-	-	12.4%	23.5%	-	11.0%	22.2%	33.3%	-	11.0%	22.1%	33.3%	44.4%	-	6.6%	17.7%	28.8%	39.9%	51.0%
ETOH%	-	10.6%	5.0%	-	15.0%	10.0%	5.0%	-	20.0%	15.0%	10.0%	5.0%	-	23.0%	20.0%	15.0%	10.0%	5.0%	-

Table S6. Modeled fuel blends for France 98 RON

Oxygen Wt %:	0	3.7%			5.2%				6.9%					8.0%					
Blend:	E0	E10	E5ETB E12	ETBE24	E15	E10ETB E11	E5ETB E22	ETBE33	E20	E15ETB E11	E10ETB E22	E5ETB E33	ETBE44	E23	E20ETB E7	E15ETB E18	E10ETB E29	E5ETB E40	ETBE51
Reformate %	13.2%	55.7%	47.9%	31.5%	49.6%	32.9%	26.7%	20.4%	32.7%	26.6%	20.3%	14.0%	7.8%	28.9%	25.3%	19.0%	12.7%	6.5%	0.2%
Additional Aromatics* %	22.8%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Naphtha %	-	1.1%	4.6%	2.8%	4.5%	2.5%	6.0%	9.5%	3.2%	6.6%	10.1%	13.7%	17.2%	5.7%	7.7%	11.2%	14.7%	18.3%	21.8%
Other Gas %	64.0%	32.5%	30.0%	42.2%	30.9%	43.5%	40.2%	36.8%	44.1%	40.8%	37.4%	34.0%	30.7%	42.4%	40.5%	37.1%	33.7%	30.4%	27.0%
ETBE %	-	-	12.4%	23.5%	-	11.0%	22.2%	33.3%	-	11.0%	22.1%	33.3%	44.4%	-	6.6%	17.7%	28.8%	39.9%	51.0%
ETOH%		10.6%	5.0%	-	15.0%	10.0%	5.0%	-	20.0%	15.0%	10.0%	5.0%	-	23.0%	20.0%	15.0%	10.0%	5.0%	-

* The addition of a high-octane aromatic compound (126.1 RON) was assumed to meet 98 RON target without oxygenate

Table S7. Colombia Case Study Results (g CO_{2e} / MJ)

Oxygen Wt %:	3.7% Oxygen						
Blend:	E0	E10	E8ETBE6	E6ETBE11	E5ETBE13	E3ETBE17	ETBE24
Splash Blend	-	-	89.5	89.3	89.3	89.4	89.3
Match Blend 89 RON	94.0	88.1	87.4	86.9	86.7	86.2	85.5

Table S8. Japan Case Study Results (g CO_{2e} / MJ).

Oxygen Wt %:	1.3% Oxygen		2.7%	3.7%	
Blend:	E0	ETBE8	ETBE17	E10	ETBE24
Match Blend 89 RON	98.0	95.3	92.3	93.8	90.1

Table S9. France Case Study Results (g CO_{2e} / MJ).

95 RON					
	Weight % Oxygen				
ETBE %	0%	3.7%	5.2%	6.9%	8.0%
0%	99.4	93.9	91.5	88.6	86.8
11%	-	92.4	90.1	87.2	86.0
22%	-	91.0	88.7	85.7	84.5
33%	-	-	87.3	84.2	83.0
44%	-	-	-	83.0	81.7
51%	-	-	-	-	80.3
98 RON					
	Weight % Oxygen				
ETBE %	0%	3.7%	5.2%	6.9%	8.0%
0%	101.5	95.7	93.3	90.4	88.6
11%	-	94.2	91.8	89.0	87.8
22%	-	92.7	90.4	87.5	86.3
33%	-	-	89.0	86.1	84.8
44%	-	-	-	84.6	83.3
51%					81.8

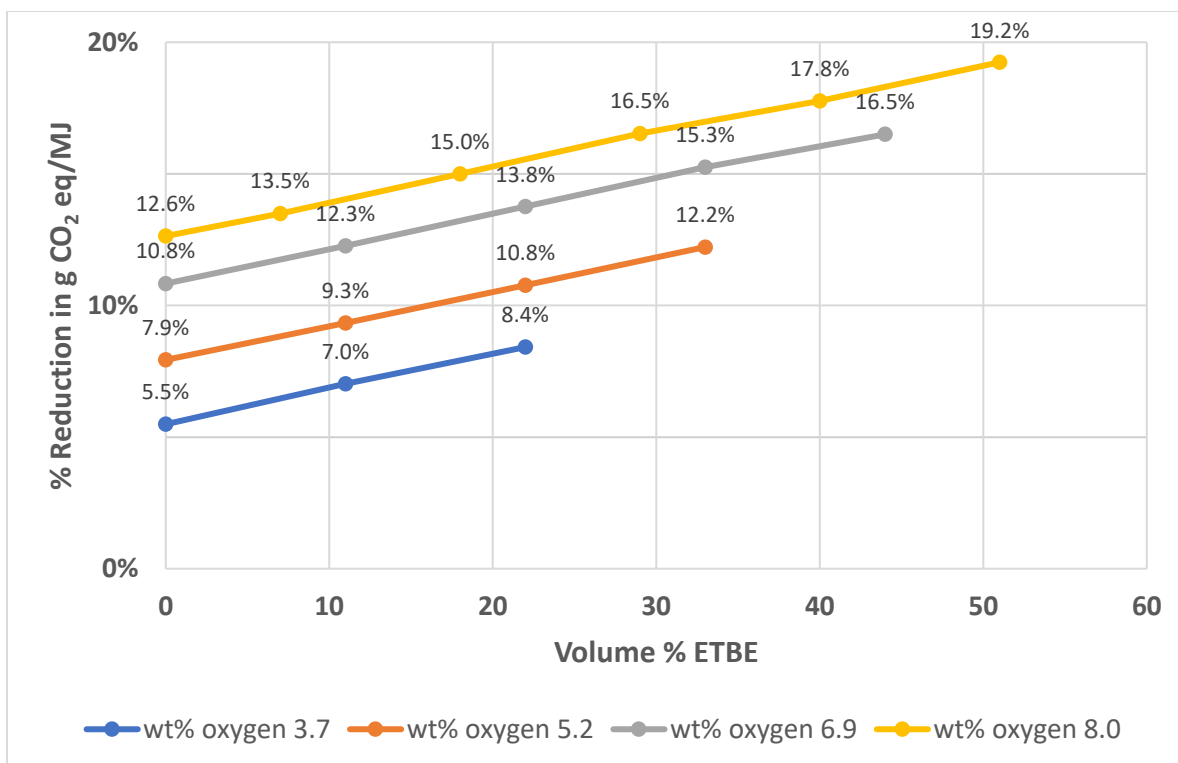


Figure S1. GHG reduction of oxygenated fuels compared to E0 (France 95 RON)

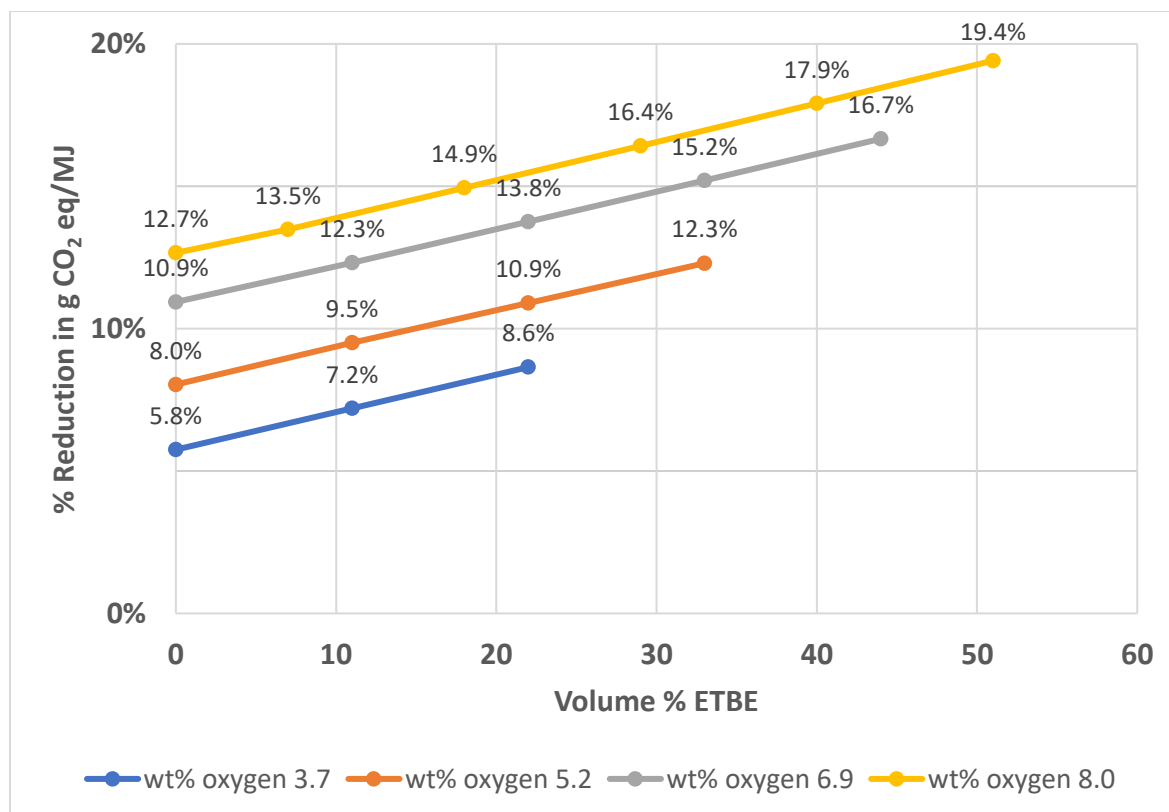


Figure S2. GHG reduction of oxygenated fuels compared to E0 (France 98 RON)

Table S10. Pathway inputs (Colombia sensitivity cases).

	100% Corn	100% Sugarcane
Gasoline BOB Production Location	US Gulf Coast	US Gulf Coast
ETBE Production Location	US Gulf Coast	US Gulf Coast
ETBE Production Pathway	TBA Pathway	TBA Pathway
Ethanol Production Location for ETBE (Primary)	US Midwest	
Ethanol Feedstock for ETBE (Primary)	US Corn	
Pct from Primary Source	100%	0%
Ethanol Production Location for ETBE (Secondary)		Cali, Colombia
Ethanol Feedstock for ETBE (Secondary)		Colombian Sugarcane
Ethanol Production Location (Primary)	US Midwest	
Ethanol Feedstock	US Corn	
Pct from Primary Source	100%	0%
Ethanol Production Location (Secondary)		Cali, Colombia
Ethanol Feedstock		Colombian Sugarcane
Blend Location	Colombia	Colombia
Transport of Product to Consumer	Truck	Truck

Table S11. Colombia sensitivity analysis results (g CO₂e / MJ).

Blend Case	E0	E10	E8ETBE6	E6ETBE11	E5ETBE13	E3ETBE17	ETBE24
100% U.S Corn (Match Blend, 89 RON)							
g CO ₂ e / MJ	94.0	89.3	88.6	88.0	87.8	87.4	86.6
Difference vs. primary case	-	+1.4%	+1.4%	+1.3%	+1.3%	+1.4%	+1.3%
100% Brazil Sugarcane (Match Blend, 89 RON)							
g CO ₂ e / MJ	94.0	87.1	86.5	85.9	85.7	85.3	84.6
Difference vs. primary case	-	-1.1%	-1.0%	-1.2%	-1.2%	-1.0%	-1.1%