

CO2 greenhouse gas created - Condensing vs Combustion

The object of this comparison is to illustrate the amount of CO2 generated by the process

Basis:	
cargo	10 psi vapor pressure gasoline
56,900	cu/ft (under roof) in one volume of 110' dia floating roof tank - roof at 6'
3,700	pounds of recoverable gasoline 600 gallons in the vapor space / floor

Condensation Process		Combustion Process	
CO2 source	pounds	CO2 source	pounds
18 gallons diesel for blower	403	18 gallons diesel for generator	403
From liquid nitrogen	771	From gasoline combustion	11,700
18 gal air compressor fuel	403	Propane supplemental fuel	1,401
		Propane handling, mfg.	1,401
CO2 created by the process	1,578	CO2 created by the process	14,904

Emission index CO2 created/pound of gasoline controlled: 0.43 4.03

Conclusion: Condensing makes 89.3% less CO2 than IC engines or thermal oxidizers

LN2 - CO2 contribution ¹	Gasoline combustion	Supplemental fuel for stoichiometric ratio
\$800 nominal cost for LN2	3,700 pounds	2 tank volumes ³
20% profit for manufacturer	600 gallons	56,900 one volume
75% everything but electricity	19.5 pounds of CO2 gal ²	113,800 volume cu/ft
5% electricity	11,700 pounds of CO2	3.50% ratio of supplemental fuel to get to stoichiometric
\$40 cost of electricity to purchase		3,983 cubic feet of propane
\$0.07 cost per kwh	Diesel fuel	109 gallons of propane
1.35 pounds of CO2 per kwh ⁴	18 gallons	12.8 pounds of CO2 per gallon ⁵
771 pounds of CO2	22.4 pounds CO2 ea	1,401 pounds of CO2
	403 pounds of CO2	
Propane fuel manufacturing		
109 gallons		
12.8 # CO2 /gal		
1,401 pounds of CO2 to manufacture, transport, handle propane		

	A	B	C	D	E	F	G	H	I	J	K	L
35	Notes:											
36	1 LN2 manufacturers do not have a number for the amount of CO2 per # LN2 produced											
37	2 Source - http://www.epa.gov/oms/climate/420f05001.htm											
38	3 Stoichiometric ratio is 6.8% fuel in air, 1.5 volumes of vapor space estimated lean											
39	4 Source - http://www.eia.doe.gov/cneaf/electricity/page/co2_report/co2report.html											
40	5&6 Source - http://www.eia.doe.gov/oiaf/1605/coefficients.html											
41												
42	Hilliard Emission Controls, Inc., 3100 Edloe Street Ste 350 Houston TX 77027											
43	PURGIT is a registered trademark of Hilliard Emission Controls, Inc.										PURGIT has been degassing tanks since 1993	