

2015 Entergy Corporate GHG Emissions breakdown by category

All numbers represent CO2 equivalents (CO2e)

Unhide columns I - U for additional calculations and conversions -->

Operational Emissions Category	Emissions Source Category	Corporate emissions source	Greenhouse gas	Total emissions short tons CO2e	Total emissions in metric tons CO2e	percentage of total corporate emissions	Calculation worksheet in inventory document	
Direct Emission Sources	Stationary Combustion	Power generating units (includes emergency and backup generators)	CO2	34,333,217	31,146,570	81.9%	Stationary Combustion CEM	
			CH4	14,107	12,797	0.0%	Stationary Combustion CEM	
			N2O	64,796	58,782	0.2%	Stationary Combustion CEM	
		Small stationary combustion sources (co-located at generation stations and stand alone units)	CO2, CH4, N2O	246,876	223,962	0.6%	All small stat cbn totals	
		Biomass power generation	CO2	0	0	0.0%	NA	
	Mobile Combustion	Corporate fleet	CO2	57,863	52,492	0.1%	Mobile Combustion	
			CH4	85	77	0.0%	Mobile Combustion	
			N2O	452	410	0.0%	Mobile Combustion	
		Biomass fleet	CO2	0	0	0.0%	NA	
	Fugitive Emissions	Natural gas transmission and distribution	CH4	87,380	79,270	0.2%	Fugitive CH4-NG T&D	
		Electricity transmission and distribution	SF6	290,573	263,603	0.7%	Fugitive SF6	
		Cooling/air-conditioning (building, mobile and nuclear cooling eqpt)	HFCs	5,905	5,357	0.0%	Fugitive HFCs	
	Process emissions	none applicable	NA	0	0	0.0%	NA	
	Total Emissions from Direct Sources				35,101,253	31,843,321	83.7%	
	Indirect Emission Sources	Purchased Electricity	Power purchased for business operations outside Entergy service territory	CO2	26,196	23,764	0.1%	Purchased power
T&D losses		Entergy purchased power consumed on Entergy T&D system	CO2, CH4, N2O	322,884	292,916	Note: these emissions are included within the Optional emissions	Purchased power	
Total Emissions from Indirect Sources				349,080	316,680			
Optional Emissions Sources	Purchased power (controllable)	Controllable purchased power sold to customers	CO2, CH4, N2O	5,615,567	5,094,357	13.4%	Purchased power	
	Purchased power (uncontrollable)	Uncontrollable purchased power sold to customers	CO2, CH4, N2O	<i>Not Applicable beginning in 2014 - See *** Note at the bottom of the Purchased power tab</i>				
	Product combustion	Combustion of natural gas distributed to customers (Scope 3 for Entergy, Scope 1 for customers)	CO2, CH4, N2O	1,143,097	1,037,000	2.7%	Natural Gas Combustion	
	Employee Commuting	Estimation of emissions resulting from employee commutes	CO2, CH4, N2O	51,557	46,772	0.1%	Employee Commuting	
Total Emissions from Optional Sources				6,810,221	6,178,129	16.2%		
GHG Stabilization Commitment Total <small>(progress toward third GHG commitment)</small>				40,195,660	36,464,889	95.8%		
Total Corporate emissions				41,937,670	38,045,214	100.0%		

Direct Emissions from fossil fuel usage at generating facilities using CEM data

2015

Generating facility and EPA Acid Rain Unit ID	EPA Acid Rain Unit ID (if different)	Max capacity (MW)	State	Entergy equity share of unit	Primary fuel(s)	CO2 from CEM		CH4	N2O	Total Facility CO2e in short tons	Total CO2e in metric tons
						Total unit CO2 (1)	Entergy equity share of unit CO2 emissions	Entergy share CH4 emissions from generation (2)	Entergy share N2O emissions from generation (3)		
						short tons CO2		short tons CO2e	short tons CO2e		
Acadia	CT3			100%	Natural Gas	777,736.50	777,736.50	365.54	435.53		
Acadia	CT4			100%	Natural Gas	777,736.50	777,736.50	365.54	435.53		
Totals							1,555,473.00	731.07	871.06	1,557,075	1,412,555
Attala	A01		MS	100%	Gas/Oil	616,818.50	616,818.50	289.90	345.42		
Attala	A02		MS	100%	Gas/Oil	616,818.50	616,818.50	289.90	345.42		
Totals		0					1,233,637.00	579.81	690.84	1,234,908	1,120,289
Baxter Wilson	1	550	MS	100%	Gas/Oil	25,028.00	25,028.00	11.76	14.02		
Baxter Wilson	2	771	MS	100%	Gas/Oil	56,864.00	56,864.00	26.73	31.84		
Totals		1321					81,892.00	38.49	45.86	81,976	74,368
Big Cajun 2 ⁽⁵⁾	2B3 (3)	257	LA	42%	Coal	2,822,441.00	1,185,425.22	320.06	5,998.25		
Totals		257					1,185,425.22	320.06	5,998.25	1,191,744	1,081,132
Calcasieu Plant	GTG1		LA	100%	Natural gas	271,247.00	271,247.00	127.49	151.90		
Calcasieu Plant	GTG2		LA	100%	Natural gas	110,090.00	110,090.00	51.74	61.65		
Totals		0					381,337.00	179.23	213.55	381,730	346,299
Gerald Andrus	1	761	MS	100%	Gas/Oil	361,028.00	361,028.00	169.68	202.18		
Totals		761					361,028.00	169.68	202.18	361,400	327,856
Hinds Energy Facility	H01	456	MS	100%	Gas CT	491,278.50	491,278.50	230.90	275.12		
Hinds Energy Facility	H02		MS	100%	Gas CT	491,278.50	491,278.50	230.90	275.12		
Totals							982,557.00	461.80	550.23	983,569	892,279
Hot Spring Energy Facility	CT-1	620	AR	100%	Gas CT	556,421.50	556,421.50	261.52	311.60		
Hot Spring Energy Facility	CT-2		AR	100%	Gas CT	556,421.50	556,421.50	261.52	311.60		
Totals							1,112,843.00	523.04	623.19	1,113,989	1,010,594
Independence	1	472	AR	56.5%	Coal	2,903,653.00	1,640,563.95	442.95	8,301.25		
Independence	2	332	AR	39.37%	Coal	2,690,312.00	1,059,175.83	285.98	5,359.43		
Totals		804					2,699,739.78	728.93	13,660.68	2,714,129	2,462,217
Lake Catherine	4	547	AR	100%	Gas/Oil	118,324.00	118,324.00	55.61	66.26		
Totals		547					118,324.00	55.61	66.26	118,446	107,452
Lewis Creek	1	260	TX	100%	Gas/Oil	747,845.00	747,845.00	351.49	418.79		
Lewis Creek	2	260	TX	100%	Gas/Oil	692,123.00	692,123.00	325.30	387.59		
Totals		520					1,439,968.00	676.78	806.38	1,441,451	1,307,663
Little Gypsy	1	244	LA	100%	Gas/Oil	0.00	0.00	0.00	0.00		
Little Gypsy	2	436	LA	100%	Gas/Oil	374,540.00	374,540.00	176.03	209.74		
Little Gypsy	3	573	LA	100%	Gas/Oil	809,312.00	809,312.00	380.38	453.21		
Totals		1253					1,183,852.00	556.41	662.96	1,185,071	1,075,079
Michoud	1	113	LA	100%	Gas/Oil	207,739.50	207,739.50	97.64	116.33		
Michoud	2	244	LA	100%	Gas/Oil	207,739.50	207,739.50	97.64	116.33		
Michoud	3	561	LA	100%	Gas/Oil	696,436.00	696,436.00	327.32	390.00		
Totals		918					1,111,915.00	522.60	622.67	1,113,060	1,009,751

Generating facility and EPA Acid Rain Unit ID	EPA Acid Rain Unit ID (Energy ID if different)	Max capacity (MW)	State	Energy equity share of unit	Primary fuel(s)	Total unit CO2 (1)	Energy equity share of unit CO2 emissions	Energy share CH4 emissions from generation (2)	Energy share N2O emissions from generation (3)	Total Facility CO2e in short tons	Total CO2e in metric tons
Ninemile Point	3	135	LA	100%	Gas/Oil	120,917.00	120,917.00	56.83	67.71		
Ninemile Point	4	748	LA	100%	Gas/Oil	1,702,537.00	1,702,537.00	800.19	953.42		
Ninemile Point	5	763	LA	100%	Gas/Oil	1,300,162.00	1,300,162.00	611.08	728.09		
Ninemile Point	6A	280	LA	100%	CCGT	742,643.50	742,643.50	349.04	415.88		
Ninemile Point	6B	280	LA	100%	CCGT	742,643.50	742,643.50	349.04	415.88		
Totals		1646					4,608,903.00	2,166.18	2,580.99	4,613,650	4,185,433
Ouachita Power	CTGEN1		LA	100%	Natural gas	555,599.00	555,599.00	261.13	311.14		
Ouachita Power	CTGEN2		LA	100%	Natural gas	707,327.00	707,327.00	332.44	396.10		
Ouachita Power	CTGEN3		LA	100%	Natural gas	645,737.00	645,737.00	303.50	361.61		
Totals		0					1,908,663.00	897.07	1,068.85	1,910,629	1,733,293
Perryville	1-1		LA	100%	Gas/Oil	786,120.00	786,120.00	369.48	440.23		
Perryville	1-2		LA	100%	Gas/Oil	786,120.00	786,120.00	369.48	440.23		
Perryville	2-1		LA	100%	Gas/Oil	30,280.00	30,280.00	14.23	16.96		
Totals		0					1,602,520.00	753.18	897.41	1,604,171	1,455,279
Rhode Island State Energy Ctr ⁽⁷⁾	RISEC 1		RI	100%	Natural gas	366,847.00	366,847.00	172.42	205.43		
Rhode Island State Energy Ctr ⁽⁷⁾	RISEC 2		RI	100%	Natural gas	363,407.00	363,407.00	170.80	203.51		
Totals							730,254.00	343.22	408.94	731,006	663,158
R S Cogen ⁽⁴⁾	RS-5		LA	50%	Natural gas	881,328.50	440,664.25	207.11	246.77		
R S Cogen ⁽⁴⁾	RS-6	425	LA	50%	Natural gas	858,168.00	429,084.00	201.67	240.29		
Totals		425					869,748.25	408.78	487.06	870,644	789,835
R S Nelson	4	500	LA	100%	Gas/Oil	457,182.00	457,182.00	214.88	256.02		
R S Nelson ⁽⁶⁾	6	385	LA	80.9%	Coal	2,641,365.00	2,136,864.29	576.95	10,812.53		
Totals		885					2,594,046.29	791.83	11,068.56	2,605,907	2,364,039
Rex Brown	3		MS	100%	Gas/Oil	0.00	0.00	0.00	0.00		
Rex Brown	4		MS	100%	Gas/Oil	15,711.00	15,711.00	7.38	8.80		
Totals		0					15,711.00	7.38	8.80	15,727	14,267
Sabine	1	230	TX	100%	Gas/Oil	419,559.00	419,559.00	197.19	234.95		
Sabine	2	230	TX	100%	Gas/Oil	296,492.00	296,492.00	139.35	166.04		
Sabine	3	420	TX	100%	Gas/Oil	650,164.00	650,164.00	305.58	364.09		
Sabine	4	530	TX	100%	Gas/Oil	1,295,170.00	1,295,170.00	608.73	725.30		
Sabine	5	480	TX	100%	Gas/Oil	675,856.00	675,856.00	317.65	378.48		
Totals		1890					3,337,241.00	1,568.50	1,868.85	3,340,678	3,030,612
Sterlington	7AB	102	LA	100%	Gas/Oil	336.00	336.00	0.16	0.19		
Sterlington	7C	101	LA	100%	Gas/Oil	336.00	336.00	0.16	0.19		
Totals		203					672.00	0.32	0.38	673	610
Waterford	1	411	LA	100%	Gas/Oil	299,857.00	299,857.00	140.93	167.92		
Waterford	2	411	LA	100%	Gas/Oil	601,430.00	601,430.00	282.67	336.80		
Waterford	4		LA	100%	Gas/Oil	9,670.00	9,670.00	4.54	5.42		
Totals		822					910,957.00	423.60	504.72	911,885	827,248
White Bluff	1	465	AR	57%	Coal	3,593,129.00	2,048,083.53	552.98	10,363.30		
White Bluff	2	481	AR	57%	Coal	3,609,929.00	2,057,659.53	555.57	10,411.76		
Totals		946					4,105,743.06	1,108.55	20,775.06	4,127,627	3,744,520
Willow Glen	2	224	LA	100%	Gas/Oil	126,224.00	126,224.00	59.33	70.69		

Generating facility and EPA Acid Rain Unit ID	EPA Acid Rain Unit ID (if different)	Max capacity (MW)	State	Entergy equity share of unit	Primary fuel(s)	Total unit CO2 (1)	Entergy equity share of unit CO2 emissions	Entergy share CH4 emissions from generation (2)	Entergy share N2O emissions from generation (3)	Total Facility CO2e in short tons	Total CO2e in metric tons
Totals			792				200,767.00	94.36	112.43	200,974	182,320
Totals						43,336,021.50	34,333,216.59	14,106.51	64,796.16	34,412,119	31,218,149

(1) CEM data reported to EPA Acid Rain program - can be verified at EPA's Clean Air Market's Database located at http://camddataandmaps.epa.gov/gdm/index.cfm?fuseaction=emissions.wizard&EQW_datasetSelection=

(2) Emissions factor derived from CH4 (in CO2e) as percentage of emissions from CO2 for a specific fuel type. See "Emissions and Conversion Factors" for EPA emissions factors for specific fuels; emissions factor for natural gas used for all dual-fuel units as this represents the larger fuel input

(3) Emissions factor derived from N2O (in CO2e) as percentage of emissions from CO2 for a specific fuel type. See "Emissions and Conversion Factors" for EPA emissions factors for specific fuels; emissions factor for natural gas used for all dual-fuel units as this represents the larger fuel input

(4) Emission data obtained directly from the EPA's Database located at <http://ampd.epa.gov/ampd/>

(5) While Entergy owns 42% of Big Cajun 2 Unit 3, our actual consumption of the MWhs generated from this facility varies from 42% to 45%. CO2 emission number shown is based on actual consumption of MWhs received from Fossil Operations.

(6) During 2012, EWC (EAM Nelson Holdings, LLC) acquired 10.9% of this unit. Therefore, Entergy's overall ownership share of this unit increased to 80.9%

(7) Rhode Island State Energy Ctr was sold in 2015 and will be removed from next year's inventory

Additional Notes

- Emissions from Louisiana Station Plant 1 (Units 1A, 2A, 3A, 4A, 5A) are not included in the inventory; these units exist for the sole use of Exxon under a long term lease agreement.
- The following units were removed from the Inventory in 2014 - Lynch 2&3, Couch 1&2, Lake Catherine 1-3, Louisiana Station 2 (units 10-12), Ninemile 1&2, Nelson 3, Richie 1&2, and Sterlington 10. These units are either permanently retired (decommissioned in some cases) or are in extended reserve shutdown and are not expected to return to service.
- The following units were ADDED to the inventory in 2014 - Ninemile 6A and 6B - these units came online during December of 2014.

Small combustion sources at all generation stations - Updated 2014

Small stationary combustion sources were initially calculated for all known equipment co-located at generating stations using parameters (such as max energy input/hour) developed in internal emissions compliance documents and assumed equipment capacity factors. These emissions totals were calculated in 2005 and are assumed to be conservative (high) estimates of emissions. These estimates were used in inventories 2000-2010, i.e. new emissions totals were not calculated for each year.

Starting in 2013, Entergy reported the previous year's GHG (CO2e) emissions from small sources co-located at Fossil plants in compliance with the EPA Mandatory Reporting Rule (General Stationary Fuel Combustion - Subpart C). These updated values are substituted for the older, 2005 calculations in order to be consistent with mandatory GHG reporting. Nuclear estimates continue to rely on the 2005 calculations unless otherwise noted. The Thermal assets were divested in late 2013, so these assets and emission are removed from the inventory.

More detail on each of these facilities, the specific data collection methods, and the calculation methodology, can be found in the GHG Monitoring Plan required by the EPA Mandatory Reporting Rule.

Plant	CO2e Emissions reported under Mandatory Reporting Rule (short tons of all gases in 2014) [obtained from Fossil Operations unless otherwise noted]	CO2e Emissions reported under Mandatory Reporting Rule (metric tons of all gases in 2014) [obtained from Fossil Operations unless otherwise noted]	
Fossil fuel generating stations			
Atalla	0.0	0.00	
Baxter Wilson	2,382.4	2,161.30	
Buras	4,589.6	4,172.80	
Calcasieu	0.0	0.00	
Gerald Andrus	2,415.7	2,191.51	
Harrison County	0.0	0.00	
Hinds County	226.2	205.25	
Hot Spring	43.4	39.35	
Independence	1,587.0	1,439.73	(49.93% ownership share)
Lake Catherine	0.0	0.00	
Lewis Creek	0.0	0.00	
Little Gypsy	11,824.9	10,727.58	
Louisiana Station	368.3	334.11	
Mablevale	0.0	0.00	
Michoud	21,306.4	19,329.14	
RS Nelson	30,479.7	27,651.15	(91.4% ownership share)
Ninemile Point	3,717.9	3,372.85	
NISCO	3,086.7	2,809.35	
Ouachita	1,480.9	1,343.50	
Perryville	4,655.7	4,223.62	
Rex Brown	243.6	221.01	
Sabine	65,938.3	59,819.24	
Sterlington	0.0	0.00	
Waterford 1&2	27.1	24.58	
White Bluff	187.2	178.91	(57% ownership share)
Willow Glen	14,715.6	13,349.95	
Fossil fuel totals	169,306.6		

Nuclear generating stations	Plant total small sources CO2e (short tons using 2005 estimate calculations)
Vermont Yankee	2,278
Pilgrim	14,818
James Fitzpatrick	3,490
River Bend	687
Indian Point 2	18,558
Indian Point 3	80
Palisades ⁽¹⁾	7,757
Waterford 3	7,042
Grand Gulf	11,131
Arkansas Nuclear 1&2	11,728
Nuclear totals	77,569
All small source totals	246,876

Direct Emissions from fossil fuel usage for company mobile fleet ("Mobile Combustion")

Note: The information below was collected and results calculated based on 2014 data.

Beginning in 2013, the GWP for N2O and CH4 was modified based on the EPA final rule effective 1/1/14.

Fuel Description	Fuel Code	Units consumed (gal)	Assumptions/Comments
Diesel	D	2,991,718	Based on 2014 Entergy data provided by Carolanne Nichols, it is assumed that totals for all bi-fuel categories are split at a 90/10 ratio between constituent fuel types and are calculated as such. Bi-fuels are separated below into its constituent fuel type category and emissions calculated. Green Plug-In (JEMS) units run on diesel on the highway and electricity on the job site. CNG is measured in Gallons of Gasoline Equivalency or GGE. One gallon of CNG or GGE has the same energy value as a gallon of gasoline. "Unknown" split evenly (50/50) between diesel and gasoline.
Gasoline	G	1,174,030	
BiFuel-Gasoline/Ethanol	S	633,932	
BiFuel-Gasoline/CNG	A	9,326	
BiFuel-Gasoline/LPG	B	351	
BiFuel-Diesel/Electricity	F	8,477	
Propane	P	30	
CNG	C	52	
LPG	L	520	
Green Plug-In JEMS	J	21,058	
BiFuel-Gasoline/Electricity	H	1181	
Unknown	-	53,502	
Jet fuel		574,809	

Total gallons consumed **5,468,986**

Total units of each fuel type				CO2 using EPA Climate Leaders Efs		CO2 using WRI/WBCSD Protocol Efs	
Fuel	Total units consumed (GALLONS) - from inputs above	conversion to energy content (MMBtu/gallon)	Total MMBtu consumed	Emissions Factor (lbs CO2/MMBtu)	Total CO2 Emissions (short tons)	Emissions Factor (kg CO2/Gallon)	Total CO2 Emissions (short tons)
Diesel	3,048,004	0.1387	422,758	159.68	33,753	10.15	34,102
Gasoline	1,781,210	0.1251	222,829	156.44	17,430	8.81	17,298
Ethanol (E85)	63,393	0.0843	5,344	149.59	400	5.56	389
CNG	985	0.1251	123	116.41	7	See note	7
LPG	555	0.092	51	138.76	4	5.79	4
Propane	30	0.092	3	138.32	0	5.79	0
Jet fuel	574,809	0.135	77,599	154.72	6,003	9.57	6,064
Totals	5,468,986		728,708		57,596		57,863

Note: Emissions from Ethanol are considered "biogenic" emissions and do not contribute to net CO2 additions to the atmosphere. They are included with fossil fuel CO2 because it is de minimus.

Regarding CNG, no SCF measurement is available; used the EPA CL number as a proxy.

Direct Emissions of N2O and CH4 from mobile fleet ("Mobile Combustion")

The calculation below uses conservative N2O and CH4 emissions factors to estimate these emissions from mobile sources. The emissions factors are from EPA Climate Leaders Guidance for construction vehicles.

NOTE - Emission factors for these gases were not available for all fuel types - a conservative approach was used by using the emission factor for diesel.

N2O from mobile sources					
N2O	gallons consumed	g N2O/gal fuel	total kg N2O	short tons	CO2e short tons
Gasoline	1,781,210	0.22	391.87	0.440	131.14
Diesel	3,048,004	0.26	792.48	0.890	265.21
Jet Fuel	574,809	0.26	149.45	0.168	50.01
Propane	30	0.26	0.01	0.000	0.00
CNG	985	0.26	0.26	0.000	0.09
LPG	555	0.26	0.14	0.000	0.05
Ethanol	63,393	0.26	16.48	0.019	5.52
total					452.01

CH4 from mobile sources					
CH4	gallons consumed	g CH4 /gal fuel	total kg CH4	short tons	CO2e short tons
Gasoline	1,781,210	0.50	890.61	1.000	25.00
Diesel	3,048,004	0.58	1,767.84	1.985	49.63
Jet Fuel	574,809	0.58	333.39	0.374	9.36
Propane	30	0.58	0.02	0.000	0.00
CNG	985	0.58	0.57	0.001	0.02
LPG	555	0.58	0.32	0.000	0.01
Ethanol	63,393.20	0.58	36.77	0.041	1.03
total					85.05

total N2O and CH4 CO2e **537.07**

Total Estimated Emissions from Mobile Sources (short tons CO2e) **58,400**

Emissions from natural gas from T&D operations

The calculation below is based on as reported data from the GHG Summary Report for 2014

Gas Operation	CO2 equivalent emissions from facility subparts C-II, SS, and TT (metric tons) Subpart W, Fugitive	Total CO2 equivalent emissions (short tons)
Entergy Gulf States Louisiana, L.L.C. Gas Business	12,359.70	13,624.22
Entergy New Orleans, Inc. Gas Business	44,593.00	49,155.31
SUB-TOTAL		62,779.53

Spindletop Storage			
Storage facilities	# storage facilities	Emissions factor (metric ton CH4/station-yr)	Total metric tons CH4
fugitive emissions from storage facilities	1	675.4	675.40
vented emissions from storage facilities	1	217.3	217.30
SUB-TOTAL			

TOTALS FROM FUGITIVE NATURAL GAS

87,380	short tons CO2e
---------------	------------------------

GENERAL NOTES:

- Source for emissions factors by equipment type is the Gas Research Institute (GRI), which provides factors in
- Fugitive and oxidized CO2 are known sources of GHG emissions from a natural gas T&D system; however th

SPECIFIC NOTES:

- (1) Compressors are assumed to be for natural gas transmission, not storage.
- (2) general emissions factor used for vented gas; GRI provides emissions factors for specific equipment ventin;
- (3) EF from API Table 6-1, (American Petroleum Institute, Compendium of Greenhouse Gas Emissions Methoc
- (4) EF from GRI

Total short tons CH4	Total short tons CO2e (E*25)
744.50	18,612.50
239.53	5,988.30
	24,600.80

See note 3

See note 4

metric only.
 ese were not calculated as they are

g.
 dologies for the Oil and Gas Industry.

Direct emissions of escaped SF6 in electricity T&D system ("Fugitive emissions")

Note: The information below was as reported to the EPA under the Mandatory GHG Reporting Rule.

More detail on the specific data collection methods, and the calculation methodology, can be found in the GHG Monitoring Plan required by the EPA Mandatory Reporting Rule.

2014 fugitive SF6 emissions estimate			
SF6 Emissions (short tons) (1)	Global Warming Potential (GWP) (2)	Total CO2 Equivalent Emissions (short tons)	Total CO2 Equivalent Emissions (metric tons)
12.74	22,800	290,573.0	263,603.2

(1) Converted 25,488.86 pounds to short tons

Direct Emissions of Fugitive HFCs in all utility cooling and A/C equipment

This sheet contains calculations for all sources of fugitive HFCs. HFCs from all sources are considered de minimus (i.e. insignificant in the Entergy corporate total). The activity data required to provide the highest level of accuracy is difficult and impractical to obtain for such a small source. Instead, emissions factors have been created based on national averages for a number of variables to provide a rough estimate of these emissions. The methodology behind these emissions factors is found below.

These CO2e totals are calculated using data, provided in 2005 (for calendar year 2004), that does not change significantly between inventory years. These same data and emissions totals are used each year.

2010 Update - Facilities indicates that there is no significant change to these numbers; therefore, these numbers will continue to be carried forward each year.

2013 Update - carried historical data forward; however, updated the GWP consistent with an EPA final rule that became effective on 1/1/14.

2014 Update - removed the Thermal Operations facilities, as these were sold in late-2013.

2015 Update - **No changes made**

	square footage air-conditioned	EF: fugitive HFCs (short tons CO2e/sq ft)	Facility fugitive HFC (short tons CO2e)
Entergy owned space	2,247,576	0.00078	1,752
Entergy capital lease space	705,788	0.00078	550
Generation plant space	2,000,000	0.00078	1,559
Total Fugitive HFCs	4,953,364		3,861

Generation plant space assumes 50,000 sq. ft. per plant; 38 plants assumed; rounded to 2 million sq. ft.

From Nuclear facility			
	lbs HFC charged to equipment	EF: fugitive HFCs as CO2e (GWP=1300)	Facility fugitive HFC (short tons CO2e)
	0	1300	0

Entergy nuclear facilities **do not** use HFCs for cooling

From all Entergy-owned vehicles			
	Total CO2 from mobile sources (short tons)	EF: HFC as % of CO2 emissions **	Facility fugitive HFC (short tons CO2e)
Vehicle A/C	58,400	3.50%	2,044
Total CO2 from all mobile source fuels are included			

Total fugitive HFC emissions 5,905 short tons CO2e

* Calculation for estimating fugitive HFC emissions from building space using A/C

The calculation used in calculating the emissions factor for metric tons of CO2e fugitive HFC.	Average cooling capacity of chiller (ft2/ton of cooling capacity)	HFCs in chiller (kg HFC/tons of cooling)	Annual HFC loss factor (percent)	Total Annual HFC losses (MT HFC/1000 ft2)	Total Annual HFC losses (MT CO2e)/1000 ft2	Total Annual HFC losses (MT CO2e)/ ft2	Total Annual HFC losses (short tons CO2e)/ ft2
	280	1.2	15%	0.000642857	0.71	0.00071	0.00078
Source: ASHRAE (http://www.themcdermottgroup.com/News/Rule%20of%20thumb%20Sizing.htm) Note that this is a conservative estimate - a reasonably designed building should be more like 400.	Source: http://www.usgbc.org/LEED/tsac/energy.asp	Source: EPA Climate Leaders Guidance, January 2004. Note: This estimate is the source of the greatest uncertainty in the calculation, since the range is 2-15%, and the average is probably more like 5%.		This is the emissions factor that is applied to the square footage of air-conditioned space. This EF includes the global warming potential for HFC 134a (1,100).	Emissions factor for MT CO2e per ft2.	Emissions factor for short tons CO2e per ft2; conversion factor 1.1023	

Calculation to estimate HFCs from mobile A/C as percentage of CO2 emissions from mobile sources using national averages for equipment leakage and miles/gallon

Vehicle type	HFC Emissions Estimate			CO2 Emissions Estimate				Emissions factor
	HFC capacity (kg HFC)	annual leakage rate (percentage)	CO2 emissions (kg CO2e/yr-veh); GWP=1100	Miles per gallon	Miles per year	Emission factor (kg CO2/gal)	CO2 Emissions (kg CO2/yr-veh)	
Car	0.8	20%	176	20	15,000	8.87	6,653	2.6%
light truck	1.2	20%	264	15	15,000	8.87	8,870	3.0%

Code	Plant description		State	F		
				Total Energy purchased from plant (MWh)	Unit/Plant-Specific Emission Factor (lbs CO2/MWh), Based on Equivalent Total Output [from eGRID 2012 data, released 10/8/2015, unless otherwise noted]	CO2 emissions from purchased power (short tons) [using eGRID Unit-Specific Factors (when available)]
		70,848.00	LA	70,848.00	48.11	1,704.2
CARVILLE	Carville Energy Center	2,672,723.30	LA	2,672,723.30	709.06	947,559.9
UNION	El Dorado Power Phase	3,552,163.90	AR	3,552,163.90	868.99	1,543,397.5
EXELON	Frontier – Tenaska	764,507.30	TX	764,507.30	887.55	339,270.9
ETEC	Hardin	43,879.00	TX	43,879.00	1,478.62	32,440.3
ETEC	Jacinto Peaking Power Facility	220,474.40	TX	220,474.40	1,503.29	165,719.0
MEAM	MEAN Member Generation	12,416.96	MS	12,416.96	1,866.98	11,591.1
MONTAUK	Montauk	26,280.00	TX	26,280.00	-	-
SRMPA	Nelson 1 & 2	1,316,736.00	LA	1,316,736.00	2,261.47	1,488,878.6
OXYCHEM	Oxy Chem – Tall	2,345,262.30	LA	2,345,262.30	865.09	1,014,433.9
CARBON	Ralene	203,435.60	LA	203,435.60	-	-
SRMPA	Whitebluff	42,000.00	AR	42,000.00	2,371.76	49,807.1
Totals		11,270,726.76		11,270,726.76		5,594,802.6

Product Combustion - Emissions from combustion of Natural Gas distributed to retail customers

Values pulled from Annual GHG Inventory Report submitted by Gas Operations and provided to ESP for each location.

Gas Operation	CO2 equivalent emissions from supplier subparts LL-QQ (metric tons) Subpart NN Product Combustion	Total CO2 equivalent emissions (short tons)
---------------	--	---

Employee Commuting Emission Calculations

Commuter Travel Calculations

Commuting Method (more than 75% of time)	
Number of Employees =	14000
Walkers =	144
Bikers =	44
Carpoolers =	1154
Vanpoolers =	33
Public Transportation =	67
Individual Drivers =	12558
Total	14000

Survey # (n)	%
13	1.03%
4	0.32%
104	8.24%
3	0.24%
6	0.48%
1132	89.70%
1262	100.00%

Commuting Distance (miles one-way)				# Employees	SURVEY RESPONSES (#)	SURVEY RESPONSES (%)
	Low	Avg	High			
	0.0	0.5	0.9	202	25	1%
	1.0	3.0	5.0	1553	192	11%
	6.0	8.0	10.0	2572	318	18%
	11.0	15.5	20.0	3227	399	23%
	21.0	25.5	30.0	2548	315	18%
	31.0	35.5	40.0	3898	482	28%
Total	70.0	88.0	105.9	14000	1731	100%

Distribution of Commuting Method by Miles						
	Individual Drivers	Carpoolers	Vanpoolers	Public	Bikers	Walkers
	181	-	-	-	1	4
	1383	-	-	-	7	40
	2307	-	-	-	12	-
	2895	-	-	-	15	-
	2285	-	-	-	12	-
	3497	1154	-	33	19	-
Total	12558	1154	-	33	67	44

Method of Transportation	Miles Traveled by Method (using midpoint of mileage range)				Estimated Emissions		
	one way	round trip	yearly miles	yearly gallons	lbs	short tons	met tons
Walkers =	157	314	68811	-	-	-	-
Bikers =	122	244	51890	-	-	-	-
Carpoolers =	40957	81914	17447772	290796	5815924	2908	2638
Vanpoolers =	1181	2363	503301	3355	67107	34	30
Public Transportation =	1325	2650	564467	2298	45157	23	20
Individual Drivers =	249991	499981	106496040	4259842	85196832	42598	38645
Total			125130281	4556251	91125020	45563	41334

Employee Commuter Travel 2014

Commuting method (more than 75% of the time)	Miles travelled per year	Total emissions kg CO2e	Total emissions short tons CO2e	Total Emissions metric tons CO2e	% total commuting emissions
Individual car	106,496,040	39,890,328	43,971	39,891	77.8%
Vanpool	503,301	268,927	296	269	13.1%
Public Transportation	564,467	77,304	85	77	3.8%
Carpool	17,447,772	6,535,429	7,204	6,535	5.3%
Bikers	51,890	-	-	-	0.0%
Walkers	66,811	-	-	-	0.0%
Total	125,130,281	46,771,989	51,557	46,772	100.0%

Commuting method (more than 75% of the time)	Miles travelled per year	Greenhouse gas				% total commuting emissions
		Total emissions kg CO2e	Total emissions short tons CO2e	Total Emissions metric tons CO2e	Total emissions	
Individual car	106,496,040	CO2	38,764,559	42,330	38,765	82.9%
		CH4	69,329	76	69	0.1%
		N2O	1,056,441	1,165	1,056	2.3%
		CO2	281,213	288	281	0.6%
Vanpool	503,301	CH4	380	0.42	0.38	0.0%
		N2O	7,333	8	7	0.0%
		CO2	77,077	85	77	0.2%
		CH4	25	0.03	0.02	0.0%
Public Transportation	564,467	N2O	201	0.22	0.23	0.0%
		CO2	6,350,989	7,001	6,351	13.6%
		CH4	11,358	12.52	11.36	0.0%
		N2O	173,082	191	173	0.4%
Carpool	17,447,772	CO2	-	-	-	0.0%
		CH4	-	-	-	0.0%
		N2O	-	-	-	0.0%
		CO2	-	-	-	0.0%
Bikers	51,890	CH4	-	-	-	0.0%
		N2O	-	-	-	0.0%
		CO2	-	-	-	0.0%
		CH4	-	-	-	0.0%
Walkers	66,811	CO2	-	-	-	0.0%
		CH4	-	-	-	0.0%
		N2O	-	-	-	0.0%
		CO2	-	-	-	0.0%
Total	125,130,281	46,771,988	51,557	46,772	100.0%	

Calculation for Public Transportation	# of miles	Total emissions kg CO2e
50% Bus	282,233	30,246
5% Intercity Rail	28,223	5,231
5% Commuter Rail	28,223	4,864
40% Transit Rail	225,787	36,962
Total	564,467	77,304

EPA Methodology

E=VMT*(EF _{CO2} + EF _{CH4} *0.021 + EF _{N2O} *0.310)	Method of travel	EF _{CO2} (kg CO2/vehicle-mile)	EF _{CH4} (g CH4/vehicle-mile)	EF _{N2O} (g N2O/vehicle-mile)
E= total CO2e	Individual car	0.364	0.031	0.032
VMT= vehicle miles travelled per year	Vanpool	0.519	0.036	0.047
EF _{CO2} = CO2 emissions factor	Carpool	0.364	0.031	0.032
EF _{CH4} = CH4 emissions factor	Bus	0.107	0.006	0.006
EF _{N2O} = N2O emissions factor	Short haul airline (domestic)	0.185	0.0104	0.0085
0.021= conversion factor	Medium haul airline (continental)	0.229	0.0104	0.0085
0.310= conversion factor	Long haul airline (intercontinental)	0.277	0.0104	0.0085
*used for individual car, carpool and vanpool	Intercity rail	0.185	0.002	0.001
	Commuter rail	0.172	0.002	0.001
	Transit rail	0.163	0.004	0.002

E=PMT*(EF _{CO2} + EF _{CH4} *0.021 + EF _{N2O} *0.310)	Estimating Fuel Use
E= total CO2e	Fuel use= DT x FE
PMT= passenger miles travelled per year	DT= Distance travelled activity factor
EF _{CO2} = CO2 emissions factor	FE= Fuel economy factor (ie, kgCO2/mile, gCH4/mile, gN2O/mile) *see emissions factors chart above
EF _{CH4} = CH4 emissions factor	*used to determine the breakdown of CO2, CH4, N2O within total CO2e.
EF _{N2O} = N2O emissions factor	
0.021= conversion factor	
0.310= conversion factor	
*used for bus, air and rail travel	

EPA Methodology sourced from EPA website
http://epa.gov/climateleadership/documents/resources/commute_travel_product.pdf
http://www.epa.gov/climateleadership/documents/resources/mobilesource_guidance.pdf

Assumptions
 9/80 schedule - all employees commute nine days every two weeks
 2 weeks of vacation
 12 holidays
 For a total of 213 work days per employee per year
 Walkers and bike riders all put into 0 to 5 miles
 Carpoolers and Vanpoolers all put in the over 30 miles category
 Used midpoint of mileage ranges surveyed
 Assuming 20 pounds of CO2 emitted per gallon of fuel burned
 Methodology sourced from EPA Climate Leaders: Greenhouse Gas Inventory Protocol Core Module Guidance
 Specific sections: "Optional Emissions from Community Business Travel and Product Transport"
 "Direct Emissions from Mobile Combustion Sources"
 Data sourced from Copy of Employee Commuting Emission Estimation 2014.
 Public transportation method compiled from percentages estimated from data recording passenger trips in urbanized areas: 50% bus, 5% intercity rail, 5% commuter rail and 40% transit rail.
 Source: US Census Bureau, Statistical Abstract of the United States: 2012
 Mileage based off of a survey of 1400 employees.
 Data sourced from Copy of Employee Commuting Emission Estimation 2014.

EPA Climate Leaders Emissions Factors for Fossil Fuel and Biomass Combustion

The emissions factors below have been updated from the EPA Climate Leaders GHG inventory Protocol, October 2004 and with any other EPA Final Rules.

Fuel type	Heating Value (HHV): custom heating values should be used if available	Carbon content coefficient (kg C/MMBtu) (based on HHV)	Fraction oxidized	CO2 Emissions -- kg			CO2 Emissions -- lbs			CH4 Emissions				N2O Emissions			
				EPA emission factor (kg CO2/MMBtu) (HHV)*	EPA emission factor (kg CO2/mass or volume unit)	EPA emission factor (kg CO2/mass or volume unit)	EPA emission factor (lbs CO2/MMBtu) (HHV)*	EPA emission factor (lbs CO2/mass or volume unit)	EPA emission factor (lbs CO2/mass or volume unit)	EPA emission factor (g CH4/MMBtu)	EPA emission factor (kg CO2e/MMBtu) GWP=25	EPA emission factor (lbs CO2e/MMBtu)	CH4 (CO2e) emissions factor (lbs CO2e CH4/lb CO2)	EPA emission factor (g N2O/MMBtu)	EPA emission factor (kg CO2e/MMBtu) GWP=298	EPA emission factor (lbs CO2e/MMBtu)	N2O (CO2e) emissions (lbs CO2e N2O/lb CO2)
Liquid fossil	MMBtu/bbl			kg CO2/gallon	kg CO2/bbl		lbs CO2/gallon	lbs CO2/bbl									
Gasoline / petrol	5.253	19.34	0.99	70.95	8.79	369.18	156.44	19.38	814.04								
Kerosene	5.670	19.72	0.99	71.58	9.66	405.88	157.84	21.31	894.97								
Jet Fuel	5.670	19.33	0.99	70.17	9.47	397.74	154.72	20.88	877.02								
Aviation gasoline	5.048	18.87	0.99	68.50	8.23	345.66	151.04	18.15	762.18								
Distillate fuel (# 1,2,4, diesel)	5.825	19.95	0.99	72.42	10.08	423.36	159.68	22.23	933.51								
Residual fuel oil (#5,6)	6.287	21.49	0.99	78.01	11.68	490.44	172.01	25.75	1,081.42								
LPG	3.861	17.25	0.99	62.62	5.65	237.45	138.07	12.47	523.58								
Propane	3.824	17.2	0.99	62.44	5.71	239.90	137.67	12.59	528.98								
Ethane	2.916	16.25	0.99	58.99	4.12	172.91	130.07	9.08	381.27								
n-Butane	4.326	17.72	0.99	64.32	6.66	279.80	141.83	14.69	616.96								
Isobutane	4.162	17.75	0.99	64.43	6.42	269.52	142.07	14.15	594.29								
E85	See EPA Guidance						0.00	0.00	0.00								
CNG	1.027	14.47	0.995	52.79	.054 /cf			.12 /cf									
LNG					5.91 /gal			13.01 /gal									
Petroleum coke	6.024	27.85	0.99	101.10	609.00		0.00										
Gaseous fossil	MMBtu/mcf				cu. ft.			cu. ft.									
Natural gas (dry)	1.027	14.47	0.995	52.79	0.0542		116.41	0.1195									
										4.75 (ind)	0.119	0.262	0.00225	0.095 (ind)	0.028	0.062	0.0005
										0.95 (elect gen)	0.025	0.055	0.00047	0.095 (elect gen)	0.030	0.066	0.0006
Solid fossil	MMBtu/short ton				short ton			short ton									
Anthracite	25.09	28.26	0.99	102.58	2,573.83		226.20	5,675.30									
Bituminous coal	24.93	25.49	0.99	92.53	2,306.74		204.03	5,086.36									
Sub-bituminous coal	17.25	26.48	0.99	96.12	1,658.11		211.95	3,656.13									
Lignite	14.21	26.3	0.99	95.47	1,356.61		210.51	2,991.33									
Coke	24.80	27.85	0.99	101.10	2,507.17		222.92	5,528.31									
Unspecified (elec gen)	20.63	25.98	0.99	94.31	1,945.56		207.95	4,289.96									
Unspecified (indus)	23.03	25.75	0.99	93.47	2,151.84		206.11	4,744.81									
Biofuels																	
Wood and wood waste	15.38 MMBtu /short	25.6	0.995	92.93	1,429.23 /short		204.91	3,135.2 /short		30.1 (ind/elect gen)	0.753	1.659	0.0081	4.01 (ind/elect gen)	1.19	2.63	0.0129
Landfill gas (50/50)	502.5 Btu/cu ft.	14.2	0.995	51.81	.0260 /cf		114.24	.05733 /cf									
Biodiesel					9.29 /gal			20.48 /gal	860.35 /gal								
Ethanol (100)	3.539 MMBtu/bbl	17.99	0.99	65.30	5.5 /gal		143.99	12.13 /gal	509.46 /bbl								

Note: CH4/N2O emissions factors for all mobile sources are dependent on many variables; for mobile sources consult the EPA Guidance Protocol

Note: CH4/N2O emissions factors for all mobile sources are dependent on many variables; for mobile sources consult the EPA Guidance Protocol

Use the CH4/N2O emissions factors above for all coal types

Note: CH4 and N2O factors for wood are significant. All fossil fuels are less than 1% compared to the factors for CO2. EPA Guidance Protocol

Note: It is assumed the combustion of biomass and biofuels does not contribute to net CO2 emissions. As a result, Partners are required to list biomass CO2 emissions in terms of total gas but the emissions are not included in the overall CO2-equivalent emissions corporate inventory.

Conversion Factors used in this inventory

Mass

1 pound (lb)	453.6 grams (g)	0.4536 kilograms (kg)	0.0004536 metric tons (tonne)
1 kilogram (kg)	2.205 pounds (lb)		.0011023 short tons
1 short ton (ton)	2'000 pounds (lb)	907.2 kilograms (kg)	.9072 metric tons
1 metric ton	2'205 pounds (lb)	1'000 kilograms (kg)	1.1023 short tons (tons)

Volume

1 cubic foot (ft ³)	7.4805 US gallons (gal)	0.1781 barrel (bbl)	
1 cubic foot (ft ³)	28.32 liters (L)	0.02832 cubic meters (m ³)	
1 US gallon (gal)	0.0238 barrel (bbl)	3.785 liters (L)	0.003785 cubic meters (m ³)
1 barrel (bbl)	42 US gallons (gal)	158.99 liters (L)	0.1589 cubic meters (m ³)
1 litre (L)	0.001 cubic meters (m ³)	0.2642 US gallons (gal)	
1 cubic meter (m ³)	6.2897 barrels (bbl)	264.2 US gallons (gal)	1'000 liters (L)

Energy

1 kilowatt hour (kWh)	3412 Btu (btu)	3'600 kilojoules (KJ)	
1 megajoule (MJ)	0.001 gigajoules (GJ)		
1 gigajoule (GJ)	0.9478 million Btu (million btu)	277.8 kilowatt hours (kWh)	
1 Btu (btu)	1'055 joules (J)		
1 million Btu (million btu)	1.055 gigajoules (GJ)	293 kilowatt hours (kWh)	
1 therm (therm)	100'000 btu	0.1055 gigajoules (GJ)	29.3 kilowatt hours (kWh)

Other

kilo	1'000		
mega	1'000'000		
giga	1'000'000'000		
tera	1'000'000'000'000		
1 psi	14.5037 bar		
1 kgf / cm ³ (tech atm)	1.0197 bar		
1 atmosphere (atm)	0.9869 bar	101.325 kilo pascals	14.696 pounds per square inch (psia)
1 mile (statue)	1.609 kilometers		
1 metric ton CH ₄	21 metric tons CO ₂ equivalent		
1 metric ton N ₂ O	310 metric tons CO ₂ equivalent		
1 metric ton carbon	3.664 metric tons CO ₂		

Global Warming Potentials and Atmospheric Lifetimes (years)		
Gas Atmospheric Lifetime GWP ^a		
Greenhouse Gas	Atmospheric Lifetime	Global Warming Potential
Carbon dioxide (CO ₂)	50-200	1
Methane (CH ₄) ^{b,c}	12 +/- 3	25
Nitrous oxide (N ₂ O) ^c	120	298
HFC-23 ^c	264	14,800
HFC-125 ^c	32.6	3,500
HFC-134a ^c	14.6	1,100
HFC-143a ^c	48.3	4,470
HFC-152a ^c	1.5	124
HFC-227ea ^c	36.5	3,220
HFC-236fa ^c	209	9,810
HFC-4310mee ^c	17.1	1,640
CF ₄	50,000	6,500
C ₂ F ₆	10,000	9,200
C ₄ F ₁₀	2,600	7,00
C ₆ F ₁₄	3,200	7,400
SF ₆ ^c	3,200	22,800

Source: Unless otherwise noted by note 'c' below, IPCC 1996; Second Assessment Report (SAR). Although the GWPs have been updated by the IPCC in the Third Assessment Report (TAR), estimates of emissions presented in the US Inventory will continue to use the GWPs from the Second Assessment Report.

a 100 year time horizon

b The methane GWP includes the direct effects and those indirect effects due to the production of tropospheric ozone and stratospheric water vapor.

c Effective January 1, 2014, the Environmental Protection Agency, through issuance of a final rule, raised the GWP for methane and several classes of hydrofluorocarbons, while lowering the GWP for both nitrous oxide and sulfur hexafluoride.

The indirect effect due to the production of CO₂ is not included.

Color key to calculations in the Entergy GHG Inventory

The colored heading cells in each worksheet of this GHG inventory enable inventory managers and users update and understand the role of each step of the calculation process.

Yellow	Specific fuel or gas calculated	This heading identifies the fuel and emissions being calculated below it.
Red	Annual activity data input	This is an input cell for company activity or usage data related to this emissions source for a given facility, source or even corporate-wide. Examples of input data are gallons of gasoline, lbs of CO ₂ (provided as CEM data), or square footage of building space occupied by the company. This activity data is currently identified in the units provided during the completion of PNM's GHG inventory for years 2001-2003. For some de minimus emissions sources (such as fugitive HFCs from building space
Orange	Calculation constant	This cell contain as constant (coefficient) such as a conversion factor or unit measurement and does not to be changed annually unless there is a change to an emissions factor, input units or facility status.
Green	Calculation conversion subtotal	This figure is calculated automatically and is a subtotal or unit conversion resulting from a spreadsheet calculation such as MMBtu converted from mcf or gallons. This cell contains an emissions or conversion factor in its formula.
Blue	Emissions source total	This figure is calculated automatically and is a total of CO ₂ e (CO ₂ -equivalent) for a given emissions source (e.g. a facility or equipment type) and the sum of individual sources is carried into the annual corporate emissions table. This cell contains an emissions or conversion factor in its formula.
123.45	Emissions source total	Bolded cells contain a figure for total emissions in CO ₂ e for that source and are carried to the corporate emissions totals sheet for emissions source comparison.