2011 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	37,442,063	33,966,868	68.2%	Stationary Combustion CEM
			CH4	11,845	10,745	0.0%	Stationary Combustion CEM
			N2O	92,057	83,513	0.2%	Stationary Combustion CEM
		Small stationary combustion sources (co-located at generation stations and stand alone units)	CO2	363,976	330,194	0.7%	All small stat cbn totals
		Biomass power generation	CO2	0	0	0.0%	NA
	Mobile Combustion	Corporate fleet	CO2	63,781	57,862	0.1%	Mobile Combustion
			CH4	29	26	0.0%	Mobile Combustion
			N2O	468	424	0.0%	Mobile Combustion
		Biomass fleet	CO2	0	0	0.0%	NA
	Fugitive Emissions	Natural gas transmission and distribution	CH4	146,669	133,056	0.3%	Fugitive CH4-NG T&D
		Electricity transmission and distribution	SF6	182,775	165,811	0.3%	Fugitive SF6
		Cooling/air-conditioning (building, mobile and nuclear cooling eqpt)	HFCs	10,089	9,152	0.0%	Fugitive HFCs
	Process emissions	none applicable	NA	0	0	0.0%	NA
Total Emissions from Direct Sources				**38,313,752**	**34,757,651**	**69.7%**	
Indirect Emission Sources	Purchased Electricity	Power purchased for utility business operations outside Entergy service territory	CO2	0	0	0.0%	NA
	T&D losses	Entergy purchased power consumed on Entergy T&D system	CO2, CH4, N2O	895,395	812,289	Note: these emissions are included within the Optional emissions	Purchased power
Total Emissions from Indirect Sources				**895,395**	**812,289**		
Optional Emissions Sources	Purchased power (controllable)	Controllable purchased power sold to customers	CO2, CH4, N2O	8,331,811	7,558,492	15.2%	Purchased power
	Purchased power (uncontrollable)	Uncontrollable purchased power sold to customers	CO2, CH4, N2O	8,291,270	7,521,714	15.1%	Purchased power
Total Emissions from Optional Sources				**16,623,081**	**15,080,206**	**30.3%**	
GHG Stabilization Commitment Total (progress toward second GHG commitment)				**46,137,850**	**41,855,554**	**84.0%**	
Total Corporate emissions				**54,936,833**	**49,837,857**	**100.0%**	

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

2011

Generating facility and EPA Acid Rain Unit ID	EPA Acid Rain Unit ID (Entergy ID if different)	Max capacity (MW)	State	Entergy equity share of unit	Primary fuel(s)	CO2 from CEM: Total unit CO2 (1) short tons CO2	CO2 from CEM: Entergy equity share of unit CO2 emissions short tons CO2	CH4: Entergy share CH4 emissions from generation (2) short tons CO2e	N2O: Entergy share N2O emissions from generation (3) short tons CO2e	Total Facility CO2e in short tons	Total CO2e in metric tons
Acadia[7]	CT3			100%	Natural Gas	325800	325,800	130	195		
Acadia[7]	CT4			100%	Natural Gas	357827	357,827	143	215		
Totals							683,627	273	410	684,311	620,796
Attala	A01		MS	100%	Gas/Oil	257784	257,784	103	155		
Attala	A02		MS	100%	Gas/Oil	289411	289,411	116	174		
Totals		0					547,195	219	328	547,742	496,903
Baxter Wilson	1	550	MS	100%	Gas/Oil	1276005	1,276,005	510	766		
Baxter Wilson	2	771	MS	100%	Gas/Oil	919364	919,364	368	552		
Totals		1321					2,195,369	878	1,317	2,197,564	1,993,597
Big Cajun 2[6]	2B3 (3)	257	LA	42%[6]	Coal	4618484	1,939,763	427	8,923		
Totals		257					1,939,763	427	8,923	1,949,113	1,768,205
Calcasieu Plant	GTG1		LA	100%	Natural gas	91225	91,225	36	55		
Calcasieu Plant	GTG2		LA	100%	Natural gas	120146	120,146	48	72		
Totals		0					211,371	85	127	211,582	191,944
Cecil Lynch	2	74	AR	100%	Gas/Oil	0	0	0	0		
Cecil Lynch	3	130	AR	100%	Gas/Oil	94139	94,139	38	56		
Totals		204					94,139	38	56	94,233	85,487
Delta	1	104	MS	100%	Gas/Oil	0	0	0	0		
Delta	2	103	MS	100%	Gas/Oil	0	0	0	0		
Totals		207					0	0	0	0	0
Gerald Andrus	1	761	MS	100%	Gas/Oil	976255	976,255	391	586		
Totals		761					976,255	391	586	977,231	886,529
Hamilton Moses	1	72	AR	100%	Gas/Oil	0	0	0	0		
Hamilton Moses	2	72	AR	100%	Gas/Oil	0	0	0	0		
Totals		144					0	0	0	0	0
Harvey Couch	1	30	AR	100%	Gas/Oil	0	0	0	0		
Harvey Couch	2	131	AR	100%	Gas/Oil	18035	18,035	7	11		
Totals		161					18,035	7	11	18,053	16,377

Generating facility and EPA Acid Rain Unit ID	EPA Acid Rain Unit ID (Entergy 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
Independence	1	472	AR	56.5%	Coal	5995658	3,387,547	745	15,583		
Independence	2	332	AR	39.37%	Coal	5901140	2,323,279	511	10,687		
Totals		804					5,710,826	1,256	26,270	5,738,352	5,205,745
Lake Catherine	1	52	AR	100%	Gas/Oil	406	406	0	0		
Lake Catherine	2	51	AR	100%	Gas/Oil	67	67	0	0		
Lake Catherine	3	106	AR	100%	Gas/Oil	461	461	0	0		
Lake Catherine	4	547	AR	100%	Gas/Oil	89074	89,074	36	53		
Totals		756					90,008	36	54	90,098	81,736
Lewis Creek	1	260	TX	100%	Gas/Oil	689325	689,325	276	414		
Lewis Creek	2	260	TX	100%	Gas/Oil	509486	509,486	204	306		
Totals		520					1,198,811	480	719	1,200,010	1,088,631
Little Gypsy	1	244	LA	100%	Gas/Oil	217713	217,713	87	131		
Little Gypsy	2	436	LA	100%	Gas/Oil	404604	404,604	162	243		
Little Gypsy	3	573	LA	100%	Gas/Oil	636336	636,336	255	382		
Totals		1253					1,258,653	503	755	1,259,912	1,142,973
Louisiana 2[4]	10		LA	100%	Gas/Oil	0	0	0	0		
Louisiana 2[4]	11		LA	100%	Gas/Oil	0	0	0	0		
Louisiana 2[4]	12		LA	100%	Gas/Oil	0	0	0	0		
Totals		0					0	0	0	0	0

Generating facility and EPA Acid Rain Unit ID	EPA Acid Rain Unit ID (Entergy 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
Michoud	1	113	LA	100%	Gas/Oil	151	151	0	0		
Michoud	2	244	LA	100%	Gas/Oil	409867	409,867	164	246		
Michoud	3	561	LA	100%	Gas/Oil	1225404	1,225,404	490	735		
Totals		918					1,635,422	654	981	1,637,057	1,485,114
Ninemile Point	1	74	LA	100%	Gas/Oil	1906	1,906	1	1		
Ninemile Point	2	107	LA	100%	Gas/Oil	0	0	0	0		
Ninemile Point	3	135	LA	100%	Gas/Oil	154719	154,719	62	93		
Ninemile Point	4	748	LA	100%	Gas/Oil	1104973	1,104,973	442	663		
Ninemile Point	5	763	LA	100%	Gas/Oil	1606035	1,606,035	642	964		
Totals		1827					2,867,633	1,147	1,721	2,870,501	2,604,074
Ouachita Power	CTGEN1		LA	100%	Natural gas	164640	164,640	66	99		
Ouachita Power	CTGEN2		LA	100%	Natural gas	183652	183,652	73	110		
Ouachita Power	CTGEN3		LA	100%	Natural gas	197403	197,403	79	118		
Totals		0					545,695	218	327	546,241	495,541
Perryville	1-1		LA	100%	Gas/Oil	440666	440,666	176	264		
Perryville	1-2		LA	100%	Gas/Oil	441643	441,643	177	265		
Perryville	2-1		LA	100%	Gas/Oil	1876	1,876	1	1		
Totals		0					884,185	354	531	885,069	802,921
Rhode Island State Energy Ctr[8]	RISEP1		RI	100%	Natural gas	6438	6,438	3	4		
Rhode Island State Energy Ctr[8]	RISEP2		RI	100%	Natural gas	6379	6,379	3	4		
Totals							12,817	5	8	12,830	11,639
R S Cogen[5]	RS-5		LA	50%	Natural gas	824627	412,314	165	247		
R S Cogen[5]	RS-6	425	LA	50%	Natural gas	786180	393,090	157	236		
Totals		425					805,403	322	483	806,209	731,380
R S Nelson	3	146	LA	100%	Gas/Oil	213883	213,883	86	128		
R S Nelson	4	500	LA	100%	Gas/Oil	787838	787,838	315	473		
R S Nelson	6	385	LA	70%	Coal	4443793	3,110,655	684	14,309		
Totals		1031					4,112,376	1,085	14,910	4,128,371	3,745,195

Generating facility and EPA Acid Rain Unit ID	EPA Acid Rain Unit ID (Entergy 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
Rex Brown	1A		MS	100%	Natural gas	0	0	0	0		
Rex Brown	1B		MS	100%	Natural gas	0	0	0	0		
Rex Brown	3		MS	100%	Gas/Oil	32154	32,154	13	19		
Rex Brown	4		MS	100%	Gas/Oil	172055	172,055	69	103		
Totals		0					204,209	82	123	204,413	185,441
Robert E Ritchie	1	356	AR	100%	Gas/Oil	0	0	0	0		
Robert E Ritchie	2	544	AR	100%	Natural gas	0	0	0	0		
Totals		900					0	0	0	0	0
Sabine	1	230	TX	100%	Gas/Oil	451190	451,190	180	271		
Sabine	2	230	TX	100%	Gas/Oil	347665	347,665	139	209		
Sabine	3	420	TX	100%	Gas/Oil	569384	569,384	228	342		
Sabine	4	530	TX	100%	Gas/Oil	1310391	1,310,391	524	786		
Sabine	5	480	TX	100%	Gas/Oil	453663	453,663	181	272		
Totals		1890					3,132,293	1,253	1,879	3,135,425	2,844,410
Sterlington	10	224	LA	100%	Gas/Oil	0	0	0	0		
Sterlington	7AB	102	LA	100%	Gas/Oil	8639	8,639	3	5		
Sterlington	7C	101	LA	100%	Gas/Oil	8608	8,608	3	5		
Totals		427					17,247	7	10	17,264	15,662

Generating facility and EPA Acid Rain Unit ID	EPA Acid Rain Unit ID (Entergy 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
Waterford	1	411	LA	100%	Gas/Oil	354835	354,835	142	213		
Waterford	2	411	LA	100%	Gas/Oil	488524	488,524	195	293		
Waterford	4		LA	100%	Gas/Oil	1139	1,139	0	1		
Totals		822					844,498	337	506	845,341	766,881
White Bluff	1	465	AR	57%	Coal	5497101	3,133,348	689	14,413		
White Bluff	2	481	AR	57%	Coal	6146583	3,503,552	771	16,116		
Totals		946					6,636,900	1,460	30,530	6,668,890	6,049,915
Willow Glen	1	172	LA	100%	Gas/Oil	172451	172,451	69	103		
Willow Glen	2	224	LA	100%	Gas/Oil	20233	20,233	8	12		
Willow Glen	3	522	LA	100%	Gas/Oil	0	0	0	0		
Willow Glen	4	568	LA	100%	Gas/Oil	626649	626,649	251	376		
Willow Glen	5	559	LA	100%	Gas/Oil	0	0	0	0		
Totals		2045					819,333	328	492	820,152	744,030
Totals						**53,452,082**	**37,442,063**	**11,845**	**92,057**	37,545,965	34,061,126

(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) 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.

(5) Emission data for RS Cogen is obtained directly from the EPA's Clean Air Market's Database located at http://camddataandmaps.epa.gov/gdm/index.cfm?fuseaction=emissions.wizard&EQW_datasetSelection=

(6) 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.

(7) Purchased in 2011 - transaction closed on April 29, 2011

(8) Purchased in 2011 - transaction closed on December 21, 2011 - data obtained from EPA CAMD website - calculated 11 days of emissions from Q4 number.

Small combustion sources at all generation stations

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 have not been calculated for each year.

In 2011, Entergy reported 2010 GHG emissions from small sources co-located at Fossil plants in compliance with the EPA Mandatory Reporting Rule. Where available, these updated values have been substituted for the older, 2005 calculations. Nuclear and Thermal estimates continue to rely on the 2005 calculations.

Plant	Capacity (total MW of all units)	GHG Emissions reported under Mandatory Reporting Rule (short tons of all gases in 2010) [obtained from Fossil Operations unless otherwise noted]
Fossil fuel generating stations		
Buras	19	1,524.9
A.B. Paterson	159	0.0
Acadia[(1)]	578	0.0
Attala	455	0.0
Baxter Wilson	1321	0.0
Big Cajun[(1)]	247	154.1
Calcasieu	310	337.4
Cecil Lynch	210	18.7
Delta	207	0.0
Gerald Andrus	761	11,781.5
Hamilton Moses	144	0.0
Harvey Couch	161	0.0
Independence	804	122.7
Lake Catherine	756	3,267.1
Lewis Creek	520	0.0
Little Gypsy	1253	3,335.7
Louisiana Station	354	0.0
Mablevale	56	14,939.8
Michoud	918	0.0
Monroe	73	0.0
Natchez	73	0.0
Ninemile Point	1827	0.0
Ouachita	770	16,003.8
Perryville	691	0.0
Rex Brown	354	144.2
RISEC[(1)]	583	0.0
Robert Ritchie	900	6.0
RS Cogen[(1)]	213	0.0
RS Nelson	1031	20,554.5
Sabine	1890	53,952.0
Sterlington	386	0.0
Waterford 1&2	822	1,005.2
White Bluff	946	0.0
Willow Glen	1752	85,654.5
Fossil fuel totals	21,544	212,802.0

(1) Data obtained from EPA's GHG Data Publication Tool [http://ghgdata.epa.gov/ghgp/main.do]

Other small plants

Charity boiler	capacity	total MMBtu	total
3 boilers	52.9	1,390,212	81,362

		Plant total small sources CO2 (short tons using 2005 estimate calculations)
Nuclear generating stations		
Vermont Yankee	510	2,278
Pilgrim	670	14,818
James Fitzpatrick	825	3,490
River Bend	966	687
Indian Point	970	18,558
Indian Point 3	980	80
Waterford 3	1075	7,042
Grand Gulf	1210	11,131
Arkansas Nuclear 1&2	1694	11,728
Nuclear totals	8,900	69,812
All small source totals	30,444	**363,976**

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

Note: The information below was collected and results calculated based on 2009 data.

Fuel Description	Fuel Code	Units consumed (gal)	Assumptions/Comments
Diesel	**D**	3,294,050	
Gasoline	**G**	1,864,713	Based on 2009 Entergy data provided by Carey Stallings, 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.
BiFuel-Gasoline/Ethanol	**S**	255,855	
BiFuel-Gasoline/CNG	**A**	32,981	
BiFuel-Gasoline/LPG	**B**	3,400	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.
BiFuel-Diesel/Electricity	**F**	6,125	
Propane	**P**	55	
CNG	**C**	121	
LPG	**L**	100	"Unknown" split evenly (50/50) between diesel and gasoline.
BiFuel-Gasoline/Electricity	**H**	29	
Unknown	-	71,067	
Jet fuel (4 aircraft count)		500,000	Estimated - from Oliver Trowbridge/Roger Burns
Total gallons consumed		**6,028,496**	

Total units of each fuel type

Fuel	Total units consumed (GALLONS) - from inputs above	conversion to energy content (MMBtu/gallon)	Total MMBtu consumed	CO2 using EPA Climate Leaders Efs: Emissions Factor (lbs CO2/MMBtu)	CO2 using EPA Climate Leaders Efs: Total CO2 Emissions (short tons)	CO2 using WRI/WBCSD Protocol Efs: Emissions Factor (kg CO2/Gallon)	CO2 using WRI/WBCSD Protocol Efs: Total CO2 Emissions (short tons)
Diesel	3,335,096	0.1387	462,578	159.68	36,932	10.15	37,314
Gasoline	2,163,288	0.1251	270,627	156.44	21,168	8.81	21,008
Ethanol (E85)	25,586	0.0843	2,157	149.59	161	5.56	157
CNG	3,419	0.1251	428	116.41	25	See note	25
LPG	440	0.092	40	138.76	3	5.79	3
Propane	55	0.092	5	138.32	0	5.79	0
Jet fuel	500,000	0.135	67,500	154.72	5,222	9.57	5,274
Totals	6,027,884		803,335		**63,512**		**63,781**

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

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.

N2O from mobile sources					
N2O	gallons consumed	g N2O/gal fuel	total kg N2O	short tons	CO2e short tons
gasoline	2,163,288	0.22	475.92	0.534	165.68
diesel	3,335,096	0.26	867.12	0.974	301.87
total					**467.56**

CH4 from mobile sources					
CH4	gallons consumed	g CH4 /gal fuel	total kg CH4	short tons	CO2e short tons
gasoline	2,163,288	0.50	1,081.64	1.215	25.51
diesel	3,335,096	0.04	149.68	0.168	3.53
total					**29.04**

total N2O and CH4 CO2e	**496.59**

Total Estimated Emissions from Mobile Sources (short tons CO2e)	**64,278**

Direct Emissions from Fugitive CH4 from natural gas T&D operations

The calculation below uses 2004 pipeline type data to estimate emissions from fugutive natural gas, as data for specific pipeline types was readily available. Miles of pipe have been converted to kilometers (km) as GRI provides emissions factor for km.
Data for number of services is from the DOT Natural Gas Distribution Annuals database for 2004.
Data for meters is from 2004.
Entergy natural gas operations do not inlcude compressor stations; gas venting is minimized and not inlcuded in the calculations.
2010 - asked Gas Ops representatives to review these numbers - they indicated there have been no significant changes to the data below.

Note: The information below was collected and results calculated based on 2004 data. As this is a de minimus category, this information is not collected and/or recalculated.

2004

Pipeline type	Miles of pipe	Conversion to km (1.61 km/mi.)	Emissions factor (metric ton CH4/km/year)	Total metric tons CH4	Total short tons CH4	Total short tons CO2e
Transmission pipe -ENO						
Bare Steel (unprotected mains)	0	0.00	0.0777	0	0	0
Coated Steel (protected mains)	33	52.80	0.0043	0.22	0	5
Plastic	0	0.00	0.0064	0	0	0
sub-total	33	52.80		0	0	5
Main pipe - ENO						
Steel (protected, coated)	1,026	1,641.60	0.0365	60	66	1,387
Steel (protected, bare)	0	0.00	0.0365	0	0	0
Steel (unprotected)	0	0.00	1.3111	0	0	0
Cast iron	324	518.40	2.8409	1,473	1,623	34,091
Plastic	145	232.00	0.1953	45	50	1,049
sub-total	1,495	2,392.00		1,578	1,740	36,527
Main pipe - EGSI						
Steel (protected, coated)	848	1,356.80	0.0365	50	55	1,146
Steel (protected, bare)	4	6.40	0.0365	0	0	5
Steel (unprotected)	0	0.00	1.3111	0	0	0
Cast iron	35	56.00	2.8409	159	175	3,683
Plastic	723	1,156.80	0.1953	226	249	5,230
sub-total	1,610	2,576.00		3,531	3,892	10,065

Services	# of services	no conversion	Emissions factor (metric ton CH4/service/year)	Total metric tons CH4	Total short tons CH4	Total short tons CO2e
Services - ENO						
Cathodically protected (coated steel)	43,585		0.0034	148	163	3,430
Unprotected (coated steel)	76,733		0.0326	2,499	2,755	57,852
Plastic	12,180		0.0002	2	2	51
sub-total	132,498	0.00				61,333
Services - EGSI						
Cathodically protected (coated steel)	49,146		0.0034	167	184	3,868
Unprotected (coated steel)	0		0.0326	0	0	0
Plastic	43,345		0.0002	8	9	181
sub-total	92,491	0.00				4,049

Total CO2e from pipeline system 111,978

Customer meters	# meters	Emissions factor (metric ton CH4/meter/year)	Total metric tons CH4	Total short tons CH4	Total short tons CO2e
Meters - ENO					
Residential meters	138,560	0.00265	367.18	404.75	8,499.69
Commercial meters (1)	7,463	0.00092	6.87	7.57	158.94
Meters - EGSI					
Residential meters	85,557	0.00265	226.73	249.92	5,248.32
Commercial meters (1)	4,993	0.00092	4.59	5.06	106.33
sub-total	236,573			667	14,013

Spindletop Storage

Storage facilities	# storage facilities	Emissions factor (metric ton CH4/station-yr)	Total metric tons CH4	Total short tons CH4	Total short tons CO2e	
fugitive emissions from storage facilities	1	6.754E+02	675.4	745.0	15,644	See note 3
vented emissions from storage facilities	1	217.3	217.3	239.7	5,033	See note 4
sub-total					**20,678**	

Totals for fugitive natural gas **146,669** short tons CO2e

NOTE:

Source for emissions factors by equipment type is the Gas Research Institute (GRI), which provides factors in metric only.
Fugitive and oxidized CO2 are known sources of GHG emissions from a natural gas T&D system; however these were not calculated as they are

(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 venting.
(3) EF from API Table 6-1, (American Petroleum Institute, Compendium of Greenhouse Gas Emissions Methodologies for the Oil and Gas
(4) EF from GRI

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

Note: The information below was collected and results calculated based on 2009 inventory turnover data. Basically, as Entergy orders SF6, it is assumed that the ordered amount is required to replace SF6 that has been emitted.

The data input below (lbs of fugitive SF6) has been calculated outside of this spreadsheet in a mass balance calculation tool provided by the EPA SF6 reduction program.

2009 fugitive SF6 emissions		
SF6 Emissions (lbs.) (1)	**Potential (GWP) (2)**	Equivalent Emissions
15,295	23,900	**182,775**

1) Assumes 115 lbs per cylinder
2) SF6 GWP from the IPCC Third Assessment Report

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, 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.

2004

From all Entergy air-conditioned spaces	square footage air-conditioned	EF: fugitive HFCs (short tons CO2e/sq ft) *	Facility fugitive HFC (short tons CO2e)
Entergy owned space	2,578,000	**0.00092**	2,372
Entergy capital lease space	830,000	**0.00092**	764
Generation plant space	2,000,000	**0.00092**	1,840
Total Fugitive HFCs	5,408,000		4,975

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)
Vehicular A/C	64,278	3.50%	2,250

Total CO2 from all mobile source fuels are included

From Entergy-owned district cooling operations	total charge of equipment	conservative loss factor	fugitive emissions (short tons CO2e)
NORMC (medical center) centrifugal cl	14,000	15.00%	1,365
USP (Union Station) centrifugal chillers	15,370	15.00%	1,499
			2,864

NORMC chillers have 14,000 lbs charge total
USP has 3 chillers rated at 1933 tons each; assumed 2.65 lbs. (1.2 kg) HFCs per ton cooling
Loss factor is conservative; fewer annual fugitive gas is likely

Total fugitive HFC emissions **10,089** 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	0.84	0.00084	**0.00092**
	Source: ASHRAE (http://www.themcdermottgroup.com/Newsworthy/HVAC%20Issues/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 Gudance, 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 (1,300).	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

HFC Emissions Estimate				**CO2 Emissions Estimate**				**Emissions factor**
Vehicle type	HFC capacity (kg HFC)	annual leakage rate (percentage)	CO2 emissions (kg CO2e/yr-veh); GWP=1300	Miles per gallon	Miles per year	Emission factor (kg CO2/gal)	CO2 Emissions (kg CO2/yr-veh)	Emissions factor: HFC emissions (CO2e) to CO2 (as %)
Car	0.8	20%	208	20	15,000	8.87	6,653	**3.1%**
light truck	1.2	20%	312	15	15,000	8.87	8,870	**3.5%**

Power purchased to serve utility customers

Controllable power purchases

Code	Plant description		State	2011 Total Entergy purchased from plant (MWh)	2011 Unit-Specific Emission Factor (lbs CO2/MWh) [from eGRID2010 (v1.1 - 2007 data)]	2011 CO2 emissions from puchased power (short tons) [using eGRID Unit-Specific Factors (when available)]	Comments/Notes
[redacted]						12,352.5	
						21,851.9	
						108,902.9	
						238,292.6	
						66,504.5	
						1,753,136.7	
						5,416.2	
						795,485.9	
						7,523.2	
						27,515.9	
						24,778.6	
						882,027.4	
						3,261.0	
						66,071.2	
						185,721.6	
						179.8	
						691,614.7	
						10,866.0	
						19,192.5	
						950.4	
						28,755.4	
						92,640.6	
						3,973.8	
						246.0	
						30,165.2	
						3,168.0	
						50,701.9	
						1,388,901.9	
						26,751.2	
						433.8	
						381.6	
						1,662.5	
						1,648,085.1	
						1,388.0	
						78,433.4	
						12,026.6	
						10,265.5	

* - site specific emission factor not available - used SERC MS Valley Factor

			Total DU Power Purchases (from Utility Acctg)	**32,895,586**
Totals	16,444,886	8,299,625.7		
CH4 emissions from controlled purchases (SERC MS Valley eGRID 2010 factor*)	0.0218	lbs/MWh		3,764
N2O emissions from controlled purchases (SERC MS Valley eGRID 2010 factor*)	0.01115	lbs/MWh		28,421

* - some units may be in different control areas or eGRID subregions; however, impact to the overall GHG inventory is expected to be negligible.

Total CO2e from Controllable Purchases **8,331,811** short tons

Non-controllable - system power purchases

			Total Entergy uncontrolled power purchases (MWh)	CO2 emissions (short tons CO2e)
CO2 emissions from non-controllable purchases (SERC MS Valley eGRID 2010 factor)	1004.1	lbs/MWh	16,450,700	8,259,074
CH4 emissions from non-controllable purchases (SERC MS Valley eGRID 2010 factor)	0.0218	lbs/MWh		3,766
N2O emissions from non-controllable purchases (SERC MS Valley eGRID 2010 factor)	0.01115	lbs/MWh		28,431
				8,291,270

* - some units may be in different control areas or eGRID subregions; however, impact to the overall GHG inventory is expected to be negligible.

Compare totals

	2009				
	total emissions tons CO2	% of total	total pchsd power MWh	% of total	intensity (tons/MWh)
Controllable	8,331,811	50.12%	16,444,886	49.99%	0.507
Non-controllable	8,291,270	49.88%	16,450,700	50.01%	0.504
	16,623,081		32,895,586		

Indirect Emissions associated with purchased power	Total pchsd power MWh	Loss factor %	Total power lost MWh	emissions factor lbs GHG/MWh	Total CO2e - losses short tons
CO2 emissions from T&D losses of purchased power on Entergy system	32,895,586	5.4%	1,776,362	1004.1	891,822
CH4 emissions from T&D losses of purchased power on Entergy system				0.0218	407
N2O emissions from T&D losses of purchased power on Entergy system				0.0115	3,166
Total CO2e from losses from purchased power					**895,395**

T&D Loss factor calculation using 2004/Q4	
Energy losses (1)	Total power (2)
1,859,155	35,922,997
1,203,122	17,331,394
2,440,212	48,539,917
473,629	9,073,068
2,058,894	38,393,526
8,035,012	149,260,902
loss factor	**5.4%**

(1) data from FERC form 1 lines 18 and 27
(2) data from FERC form 1 lines 9,10, and 16

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.

				CO2 Emissions -- kg			CO2 Emissions -- lbs			CH4 Emissions				N20 Emissions			
Fuel type	Heating Value (HHV): custom heating values should be used if available	Carbon content coefficient (kg C/MMBtu) (based on HHV)	Fraction oxidized	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=21	EPA emission factor (lbs **CO2e**/MMBtu)	CH4 (**CO2e**) emissions factor (**lbs** CO2e CH4/**lb** CO2)	EPA emission factor (g N20/MMBtu)	EPA emission factor (kg **CO2e**/MMBtu) GWP=310	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	Note: CH4/N2O emissions factors for all mobile sources are dependent on many variables; for mobile sources consult the EPA Guidance Protocol							
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	1.8 (ind) 2.7 (elect gen)	0.038 0.057	0.083 0.125	0.0005 0.0008	.54 (ind) .54 (elect gen)	0.1674 0.1674	0.369 0.369	0.0023 0.0023
Residual fuel oil (#5,6)	6.287	21.49	0.99	78.01	11.68	490.44	172.01	25.75	1,081.42	1.8 (ind) 2.7 (elect gen)	0.038 0.057	0.083 0.125	0.0005 0.0007	1.8 (ind) 2.7 (elect gen)	0.1674 0.1674	0.369 0.369	0.0021 0.0021
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	Note: CH4/N2O emissions factors for all mobile sources are dependent on many variables; for mobile sources consult the EPA Guidance Protocol							
Isobutane	4.162	17.75	0.99	64.43	6.42	269.52	142.07	14.15	594.29								
E85	ee 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	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) 0.95 (elect gen)	0.100 0.020	0.220 0.044	0.0019 0.0004	0.095 (ind) .095 (elect gen)	0.029 0.029	0.065 0.065	0.0006 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		10.0 (ind) 1.0 (elect gen)	0.210 0.021	0.463 0.046	0.0022 0.0002	1.4 (ind) 1.4 (elect gen)	0.43 0.43	0.96 0.96	0.0046 0.0046
Bituminous coal	24.93	25.49	0.99	92.53	2,306.74		204.03	5,086.36		% of "unspecified coal"				% of "unspecified coal"			
Sub-bituminous coal	17.25	26.48	0.99	96.12	1,658.11		211.95	3,656.13		Use the CH4/N2O emissions factors above for all coal types							
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)	0.632	1.394	0.0068	4 (ind/elect gen)	1.24	2.74	0.0134
Landfill gas (50/50)	502.5 Btu/cu ft.	14.2	0.995	51.81	.0260 /cf		114.24	.05733 /cf		Note: CH4 and N2O factors for wood are significant. All fossil fuels are less than 1% compared to the factors for CO2.							
Biodiesel					9.29 /gal			20.48 /gal	860.35 /gal	EPA Guidance Protocol							
Ethanol (100)	3.539 MMBtu/bbl	17.99	0.99	65.30	5.5 /gal		143.99	12.13 /gal	509.46 /bbl								

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		
1metric ton N_2O	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 (CO2)	50-200	1
Methane (CH4)b	12 +/- 3	21
Nitrous oxide (N2O)	120	310
HFC-23	264	11,700
HFC-125	32.6	2,800
HFC-134a	14.6	1,300
HFC-143a	48.3	3,800
HFC-152a	1.5	140
HFC-227ea	36.5	2,900
HFC-236fa	209	6,300
HFC-4310mee	17.1	1,300
CF4	50,000	6,500
C2F6	10,000	9,200
C4F10	2,600	7,00
C6F14	3,200	7,400
SF6	3,200	23,900

Source: 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.

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 CO2 (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 CO2e (CO2-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 CO2e for that source and are carried to the corporate emissions totals sheet for emissions source comparison.