Greenhouse Gas Inventory Management Plan and Reporting Document (IMPRD)

Entergy Corporation
New Orleans, LA

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QUANTIFICATION STANDARD: ISO 14064-1
Level of Assurance: Limited

Entergy's GHG Commitment Snapshot
Base Year – 2000

Original Commitment Years –	2001 to 2005
Original Commitment –	Stabilize at 2000 levels direct CO_2 emissions from power plants
Original Commitment Funding –	\$25 million (\$5 million per year)
Second Commitment Years –	2006 to 2010
Second Commitment –	20% below 2000 levels direct CO_2 emissions & cont. purchased power
Second Commitment Funding –	\$3.25 million (\$650K per year)
Third Commitment Years –	2011 to 2020
Third Commitment –	20% below 2000 levels direct CO_2 emissions & cont. purchased power
Third Commitment Funding –	\$10 million (\$1 million per year)

Entergy Corporation Greenhouse Gas Inventory Management Plan and Reporting Document

Introduction and Background

In May 2001, Entergy publicly committed to stabilize CO_2 emissions from its power plants at year 2000 levels through 2005, and dedicated $25 million in supplemental corporate funding to achieve this target over the five-year period. This commitment was focused on CO_2 emissions from fuel combustion at the company's power plants and requires that Entergy:

- Stabilize CO_2 emissions from its U.S. power plants at year 2000 levels through 2005.
- Establish the $25 Million Environmental Initiatives Fund (EIF) in support of achieving the 2001-2005 stabilization targets.
- Document activities and annual report progress.
- Employ an independent third party organization to verify measurement of Entergy's CO_2 emissions from U.S. power plants.

Entergy joined EPA's Climate Leaders Program in 2004 (the program was discontinued in 2010) and began the process of renewing its GHG commitment by developing a detailed inventory of all GHGs resulting from its operations. The inventory development and results were documented in this Inventory Management Plan and Reporting Document (IMPRD). Entergy's second commitment included:

- Stabilize CO_2 emissions from all Entergy power generation plants plus controllable purchased power at 20% below 2000 levels through 2010.
- Commit funding of $3.25 million in support of achieving the 2005-2010 target.
- Document activities and annually report progress.

In 2011, Entergy once again renewed its commitment to stabilize GHGs with a third commitment:

- Stabilize CO_2 emissions from all Entergy power generation plants plus controllable purchased power at 20% below 2000 levels through 2020.
- Commit funding of $10 million in support of achieving the 2011-2020 target.

- Document activities and annually report progress.

Beginning in 2012, Entergy decided to conduct the third-party verification audit to the International Standards Organization (ISO) standard for GHG development and verification (ISO 14064). As a part of this verification, this document was revised and upgraded in 2012 to include several aspects required by the standard. This IMPRD and Entergy's 2011 GHG Inventory is verified to ISO 14064-1 at a LIMITED Level of Assurance.

This IMPRD has been created and subsequently revised according to the requirements in the World Resources Institute and the World Business Council for Sustainable Development Greenhouse Gas Protocol, 2004 revised edition, and formatted according to the US EPA Climate Leaders 2004 draft checklist of IMPRD components. Additionally, the document was upgraded in 2012 to the standards contained in ISO 14064-1.

This IMPRD is used to create and document an inventory that was previously reported to the Climate Leaders program and other external parties. However, EPA announced in 2010 that the Climate Leaders program was being discontinued. This IMPRD will continue to be updated and used to document Entergy's GHG Inventory methodology and results on an annual basis. Entergy has made an estimate of all emissions, including small sources, for reporting externally. Entergy also registers its emissions and offset purchases to the American Carbon Registry (www.americancarbonregistry.org).

The current GHG Inventory (by calendar year) is attached to this document as Attachment 1 and is referenced throughout.

Reporting Entity Information

Entergy Corporation (Entergy) is an integrated energy company engaged primarily in electric power production and retail distribution operations. Entergy owns and operates power plants with approximately 30,000 megawatts of electric generating capacity, and it is the second largest nuclear generator in the United States. Entergy delivers electricity to 2.7 million utility customers in Arkansas, Louisiana, Mississippi, and Texas. Entergy has annual revenues of more than $11 billion (2011) and approximately 15,000 employees. Additional company information can be located at www.entergy.com.

Company address:	639 Loyola Avenue New Orleans, Louisiana 70113
IMPRD/GHG Inventory Contact:	Brent Dorsey - Director, Environmental Programs Environmental Strategy and Policy (ESP) Group (504) 576-5084 (New Orleans) (281) 297-3321 (Houston) bdorsey@entergy.com

Boundary Conditions

Consolidated Approach for Emissions Reporting – Entergy has elected to include all company-owned assets and those under a capital lease, consistent with “equity share” reporting under EPA and WRI reporting protocols. Where partial ownership share of an asset exists, only Entergy’s owned portion of the asset/emissions is included in the inventory. Additionally, Entergy has opted to include those emissions associated with the electricity purchased to support grid operations and meet customer demand, primarily due to an increased reliance on purchased power since 2003. The GHG emissions resulting from the full life cycle of the various fuel sources are not included in the inventory.

Other emission sources (including transportation assets, sulfur hexafluoride [SF_6], building air conditioning and refrigeration equipment, losses from natural gas distribution system, etc.) that have emissions estimated to be less than 1% of the total inventory are considered *de minimus* unless they are anticipated to change dramatically and grow above this threshold. Emissions of each GHG from facilities/assets that are *de minimus* are estimated and included in the inventory for each gas and/or source. The same data are used for future years unless one of the categories of emissions changes significantly. These estimates will be recalculated approximately every five years (or as updated data becomes available), after major equipment changes, asset acquisition and/or asset divestiture in order to reconfirm *de minimus* status.

Facilities List –The majority of Entergy’s emissions are from fossil-fueled electricity generation facilities. However, other sources include small sources at other company facilities, a full list of facilities included in the inventory is contained in Attachment 1. This list identifies Entergy’s fossil-fueled electricity generation assets and ownership share. All other GHG emission-producing assets are assumed to be 100% owned by Entergy.

List of GHGs Included – Entergy includes the following from various sources in its inventory and management program:

- Carbon dioxide (CO_2)
- Methane (CH_4)

- Nitrous Oxide (N_2O)
- Sulfur Hexafluoride (SF_6)
- Hydrofluorocarbons (HFC)

Entergy Corporation Emission Sources

Process for Identifying Emissions Sources – The Climate Leaders spreadsheet "General Emission Source Checklist" (Attachment 2), created by Platts/E-source as contractors to EPA's Climate Leaders program, was originally utilized as an overall roadmap to help identify GHG emission sources at Entergy locations. Within each line item, a determination was made as to the applicability to Entergy's operations. The findings of this analysis are presented in the section below. Additionally, publicly-available data, previous equipment inventories, internal company data and existing air permit information were utilized to identify GHG sources at company locations. This includes an extensive analysis and estimates of emissions from small combustion sources co-located at electrical power generating facilities or at stand alone facilities. The specific information gathered and its sources are shown in Attachment 1 and 2 and summarized in the sections below. Additionally, this information was further refined and updated based on data submitted to the EPA GHG Reporting Program in 2011. Entergy is confident that this methodology has captured emission estimate information for the majority of small source equipment at its locations.

Direct Sources

Entergy's direct emissions are included in the following categories:

- ⇨ Stationary combustion: Entergy's direct sources of GHGs include emissions from the direct combustion of fossil-fuels in electrical generation boilers and small sources at company facilities.
- ⇨ Mobile Combustion: Fossil fuels combusted in company fleet vehicles.
- ⇨ Fugitive Emissions: Methane (CH_4) from natural gas distribution systems, SF_6 from power transmission and distribution equipment, and HFCs from building HVAC systems and district cooling operations.

Company activity data sources including contacts and information for the various emissions from and/or usage of these assets are included in Attachment 2.

Indirect Sources

Entergy's indirect sources of emissions include those from purchased electricity and electrical line transmission/conversion losses. Data sources for the various emissions from and/or usage of these assets are included in Attachment 2. All electricity consumed in the operation of generating plants and consumed in Entergy's various administrative and commercial buildings and operations are accounted for in Entergy's direct emissions for stationary combustion. Additionally, line losses for self-generated and purchased electricity are accounted for by the additional generation necessary to make-up for these losses. There are no other indirect sources included in Entergy's inventory or program.

Optional Sources

Entergy is reporting emissions associated with power purchased to meet customer demand and support grid operations. This emission source is not required under EPA and WRI reporting protocols. Entergy has elected to report these emissions because it has decreased its self generation while increasing the amount of power it purchases. Subsequently, trends in the Direct emissions category will not accurately represent the full corporate emissions footprint and trends toward a reduction goal. Including purchased power presents the most accurate representation of the emission footprint required to support grid operations and meet customer demand. Other optional sources such as employee travel and commuting are not included at this time; however, these will be evaluated for inclusion in the future.

GHG Emissions Quantification

Quantification Method and Emission Factors

The quantification methodologies used in the Entergy inventory are commonly accepted methods for measuring GHG emissions. For inventory years 2000-2004, Entergy used methodologies outlined in the EPA Climate Leaders Protocol, or methodologies proposed by Platts/E-source staff and approved by EPA Climate Leaders staff. In a number of cases, Entergy has used conservative estimation methodologies for expected *de minimus* emission sources (<1% of corporate total). In all cases, these estimation methodologies have were reviewed and approved by EPA Climate Leaders staff. When emissions are based on these conservative estimates, they are identified as such below.

Emission factors used for the initial inventory were derived from various sources including *USEPA Climate Leaders GHG Protocol* (derived from AP-42), US DOE, and EPA's eGRID system. The quantification methodologies, emission factors and their sources can be found in the GHG inventory calculation spreadsheets, accessible through Entergy's internal website, **SENet**. Entergy remained engaged with the EPA Climate Leaders Program updates and staff until the program was eliminated by the agency. Entergy will monitor WRI protocol and other leading sources for updates in order to stay aware of any changes to quantification methodologies, emission factors, or protocol changes.

These approaches for emission quantifications were chosen because they represent the most accurate and, in most cases, the only data source for such an exercise. Other methods were not chosen due to the fact that other methods simply do not exist.

Direct Emissions

Entergy's direct emissions are either measured directly via a continuous emissions monitoring (CEM) system, calculated using emission factors and fuel throughput or other relevant data, or estimated using equipment capacity factors and maximum fuel throughput data. Direct GHG emissions are quantified separately for each GHG, and then aggregated across Entergy by GHG constituent. The quantification method and data source for each major category of direct GHG sources is detailed below.

> Fossil-Fuel Combustion Boilers and Gas Turbines – Entergy's electrical generation equipment is heavily regulated by state and federal agencies and is required to report emissions on a periodic basis. A continuous emission monitoring (CEM) system is used at most plants to directly monitor emissions. CO_2 is directly monitored in these systems and other GHGs, such as CH_4 and

N_2O, are calculated based on the data collected by these systems. However, in some cases, CO_2 is calculated based on fuel throughput and heat rate data. However the CO_2 number is derived, it is reported to the EPA as required under various agency regulatory programs. In 2011, this category represented 68.3% of the corporate total.

Source: This GHG emissions data is reported to the ESP Group by Entergy's Fossil Environmental Support Group annually (at a minimum).

Small Sources at Company Facilities – This category includes equipment such as emergency generators, house service boilers, natural gas-fired comfort heaters, and other small combustion/emission sources not monitored by CEM systems at company facilities. Inventories for 2000 to 2010 used an available equipment inventory and information contained in facility air permits and real estate personnel, small source emissions were calculated for each plant for which this data was available. This data was compiled in 1994 in the Fossil Operations Equipment Inventory. In 2011, Entergy reported small sources to the EPA GHG Reporting Program. These numbers were used in the 2011 inventory in order to align regulatory reporting with this voluntary inventory. Changes to the overall number were not material. In 2011, this category represented 0.7% of the corporate total.

Transportation Fleet Vehicles – Entergy's Transportation Group maintains a detailed inventory of vehicles owned and/or leased throughout the company. This group also tracks information regarding the fleet's fuel usage and miles traveled. Additionally, Entergy's Aviation Group (part of Human Resources and Administration) maintains fuel usage information for our fleet of corporate aircraft. This information was updated with 2009 data and used to calculate GHG emissions for this equipment category. In 2011, this category represented 0.1% of the corporate total. Entergy decided not to include GHG emissions resulting from employee business travel and employee commuting; however, it may be included in the future. Fleet emissions were quantified using units of all mobile fossil fuels and default emission factors.

Source: The source of this information is the Manager, Transportation.

Fugitive Emissions: Methane in Natural Gas Distribution and Storage Facilities – This category of emissions includes losses of methane from Entergy's natural gas distribution system and Entergy's natural gas storage facility. Losses of methane from the distribution system were estimated using the Gas Research Institute's protocol which USEPA may adopt as its standard methodology for quantifying these emissions. This protocol uses input data such as miles of pipe and number of services (steel, coated, and plastic), number of meters (commercial and residential) and gas vented to estimate methane emissions from these types of distribution systems. The emissions from the storage facility were estimated, using Tier 1 factors for natural gas storage for both vented and fugitive natural gas. In 2011, this category represented 0.3% of the corporate total.

Source: These input data were obtained from the Manager, Gas Distribution Operations and Fossil Operations, Sabine Plant.

Fugitive Emissions: HFCs – This category of emissions includes losses of HFCs from HVAC equipment at buildings which Entergy owns or for which it holds a capital lease, from Entergy's district cooling/thermal operations (chillers), and from Entergy vehicular air conditioning. For the indoor air cooling equipment, square footage of company building space was collected and an emission factor developed by Platts/E-source was applied to this number in order to estimate HFC losses from this equipment. This emission factor is based on national averages of tonnage of equipment per square foot of space and average leakage rates of common air conditioning equipment. An investigation revealed that no HFC-based air or water pre-cooling is performed at any Entergy electric power generation facilities. Conservative estimates were completed for all sources of HFC emissions; this category of emissions was determined to be *de minimus*. In

2011, this category represented less than 0.1% of the corporate total. For the district cooling operations, information regarding chiller equipment located at these facilities, along with estimates of equipment leakage rates were used to derive the initial inventory estimates. The calculations behind all factors used in estimating HFC emissions can be found in the inventory spreadsheet (Attachment 1).

Source: The source of this information was the Manager, Real Estate Operations and the Director, Thermal Operations.

Fugitive Emissions: SF_6 – This category of emissions includes unintentional releases of SF_6 used in electricity transmission equipment. Emissions of this gas are estimated using a protocol similar to the protocol utilized for EPA's SF_6 Emission Reduction Partnership Program. The protocol for derivation of this emission estimate is primarily a mass balance exercise. In 2011, this category represented 0.3% of the corporate total.

Source: The source of this information is the Manager, Environmental in Entergy's Transmission and Distribution Organization. SF_6 emission estimates are reported to ESP at least once per year.

Estimates completed for each fugitive GHG emissions category above resulted in finding that **aggregated fugitive emissions from all sources across Entergy are *de minimus*.** Accordingly, a consistent quantity of emissions is included in the inventory for each emissions source category and will be carried forward annually unless a significant change in this category occurs.

Indirect Emissions

Transmission/Distribution System Line Losses – Line losses associated with power purchased to support the utility operations are considered required indirect emissions under EPA and Scope 2 Indirect under WRI reporting requirements. Emissions from T&D losses of purchased power are calculated by applying Entergy's system loss factor to the total amount of power purchased. The custom loss factor is developed using power data from the 5 utilities' FERC Form 1s (specific data noted in "purchased power" worksheet in inventory). This custom factor was calculated for 2004 data using 2004 FERC forms. The custom loss factor calculated for 2004 was applied to purchased power amounts of previous years of GHG inventories (2000-2003) rather than recalculating this factor for each prior year. This emission estimate is calculated and presented; however, it is not subtracted from the purchased power emission number described below since the bulk of purchased power is generated from within Entergy's service area. T&D line losses are already accounted for in the extra generation required to make up for these losses.

Optional Emissions

Purchased Power – This category of emissions includes those from power purchased by Entergy to supplement its own supply in order to meet customer demand and/or support utility operations. In some cases, the source of this power is known (controllable or unit-contingent purchases). The remaining sources of purchased power are either not known (non-controllable or grid purchases) or can not be controlled for some other reason. Under the EPA and WRI protocols, including emissions from power purchased by utilities is optional. Entergy has opted to include all purchased power in its GHG inventory and subsequent tracking since these purchases are required to meet customer demand and in order to fully characterize the GHG footprint of its operations. In 2011, this category represented 30.3% of the corporate total.

Both controllable and non-controllable purchase information (in terms of millions of megawatt-hours) was collected. In the case of non-controllable purchases, the SERC MS Valley emission factors from the eGRID system (2010 version using 2007 data) were used to calculate GHG emissions. In the case of controllable purchases, supplier and unit-specific emission rate information from eGRID, where available, was used to develop a supplier-specific custom GHG emissions factor. If supplier-specific GHG emission factors were not available, the regional grid factor from eGRID was used as a default.

To avoid double counting, intra-system billing (ISB) purchases were subtracted from the non-controllable purchase total. These purchases are from the Entergy unregulated generation business (Entergy Wholesale Commodities – EWC) and are already accounted for in direct emissions. This results in obtaining the "non-affiliated purchases" from the appropriate data manager.

Source: All data regarding power purchases were obtained and are available from Entergy's System Planning Group. Primary contact for the data was the Sr. Staff Engineer in the Energy Analysis and Reporting Group. Generation Accounting supplies the TOTAL purchased power number for the entire company.

Impact of Uncertainties

The quantification and estimation methodologies used to generate Entergy's GHG Inventory have inherent uncertainties associated with them. As described above, these methodologies involve direct measurements of emissions and power generation, various types of activity data and published emission factors. Many of the data parameters described above are captured in accordance with Federal or State laws/regulations or for purposes of billing/invoicing. Accordingly, these data parameters are important to Entergy's business and are carefully scrutinized and managed.

Entergy makes every effort to ensure its GHG inventory is accurate and complete. Despite these efforts, uncertainty may still have an impact on Entergy's GHG Inventory efforts. These uncertainties are minimized using the data management tools, quality assurance efforts and validation/verification efforts described in the remainder of this document. Any impact of uncertainties is not expected to have a material impact.

Data Management

Activity Data

In all cases, the best available activity data was used to calculate or estimate emissions from a specific source. All collected data for each source is maintained by the data source identified in the previous section.

The primary source of data related to Entergy's largest category of emissions (representing 68.2% of total corporate emissions in 2011) is CEM system data. CEM system data from monitored plants is managed by Entergy's Fossil Environmental Support Group. CEM system data is closely managed and maintains a high level of quality control as required by EPA regulations (40 CFR Part 75). The Director, Fossil Environmental Support is responsible for maintaining these data; the primary contact for these data is the Supervisor, Emission Monitoring and Markets. CEMS data is sourced from the data acquisition and handling system (DAHS), which is the software package used to manage and query CEMS data. A report is generated for the annual CO_2 emissions and provided to the Manager, Corporate Environmental Operations (see further description below of how the inventory is generated).

Controllable Power purchase information is managed by the Manager, System Planning using an internally developed software package called TRADES. This system is used by the power buyers to track, validate and eventually invoice individual transactions necessary to support grid operations. Total power purchase data is sourced from the Manager, Generation and Fuels Accounting and is sourced from the General Ledger (GL). ISB feeds data into the GL on a monthly basis; accordingly, the initial source of these data is ISB through the GL. Other data categories are managed as described in the section above.

Data Management

All data required for the inventory is either reported to or collected by the Manager, Corporate Environmental Operations in the ESP Group in the January/February timeframe. This information is maintained in electronic files and calculation spreadsheets. The specific steps of the process are described further below:

- DATA RECEIPT – the data described above are transmitted to ESP in the form of spreadsheet files via email attachment. This transmittal method is secure and reliable. Once received, the spreadsheet files are saved to a shared Directory under the 'GHG Inventory' folder.

- DATA REVIEW AND MANIPULATION – spreadsheets are accessed and reviewed for the relevant information. In some cases, the data are sorted, totaled and formatted to facilitate entry into the inventory spreadsheet. The data also is reviewed during this step to evaluate the overall magnitude to identify any obvious errors or omissions.

- DATA ENTRY – data is entered into the draft working version of the GHG inventory. During this step, an additional review for data reasonableness and completeness is performed. Any obvious errors or omissions are addressed directly with the data manager by phone or email, as needed. All of the data sources are either entered directly into the inventory or are used for further calculation of the necessary data points required to develop the overall inventory. All supporting calculations and spreadsheets are housed on the shared directory noted above.

- QA/QC AND TECHNICAL REVIEW – where data entry is required, a double check and a reverse double check is always performed. A double check review is simply another review of the numbers entered into the working draft version of the inventory, while a reverse double check is an evaluation of the data entered against the working draft version of the inventory to ensure all data points are included. Once this review is completed, the draft version is circulated to several technical reviewers within the company; feedback is used to modify the inventory as needed.

Annual inventories and IMPRD updates are published and posted on SENet, Entergy's intranet portal for all information related to Safety and Environmental issues. Additionally, Entergy posts the total inventory number, along with the verification statement and other information to its registry account with the American Carbon Registry (www.americancarbonregistry.org). Entergy will continue to use and update the inventory template in future years in order to remain as consistent as possible.

Key Performance Indicator Selection and Data Collection

Entergy's goal is to stabilize GHG emissions at 20% below 2000 levels on an absolute basis through 2020. The goal does not use emissions intensity; however, on an as needed basis, Entergy does calculate and evaluate GHG emission intensities. The primary intensity measure used is tons of emissions per megawatt hour.

Data Collection Process Quality Assurance

The owners of data identified in the previous section are responsible for maintaining data quality assurance. Every effort should be made to ensure that the data reported are accurate and complete. ESP will evaluate the data, once collected, to ensure that it is reasonable and consistent with past years. ESP will also conduct and document QA checks during the production of the inventory.

As part of the process each data manager uses for collecting GHG data, they must define and document any areas of possible error and the QA/QC actions they use to maintain accuracy. CEMS data quality is maintained in accordance with the compliance requirements contained in EPA regulations (40 CFR Part 75). Any departures from these data quality measures (i.e. non-compliance events) should be communicated to ESP. Possible errors in emissions factors and calculations are also documented with the emissions factors and calculations records. Any inconsistencies and large unexpected changes from the previous year's data should be sufficiently explained when the data is transmitted. The Manager, Corporate Environmental Operations will compare the current year's data for each source category to the previous year's data in order to identify any large, unexpected variations. The data should also be reviewed and all calculations that are required to ensure that the calculations are correct.

Data Collection System Security and Integrated Tools

Data is typically transferred through Entergy's e-mail system. Security of this system is the responsibility of the IT group. Security of the data once it is collected and consolidated is the responsibility of ESP. Every effort will be made to ensure the security of the inventory information, primarily by saving this information to the shared directory in the 'GHG Inventory' folder. Entergy's SENet and the Entergy's registry account with the American Carbon Registry (www.americancarbonregistry.org) will serve as the final publication repository for the GHG inventory. SENet is accessible by all employees through any computer connected to the internal network, which is password protected and controlled by IT.

Frequency

Data will be reported to/collected by ESP on an annual basis. This information will be used to produce an updated GHG inventory each year. No later than the end of the 1st quarter of each year, ESP will produce an updated inventory for the previous calendar year. A verification audit will be conducted by an independent third-party. Beginning in 2012, this verification audit will be conducted in accordance with the international standard – ISO 14064. This updated inventory will be used to track progress against the reduction goal discussed above.

Base Year

Adjustment for Structural Changes – The base year (2000) will be adjusted for mergers, acquisitions, and divestitures that occur during the reporting time frame for the goal. Actual yearly emissions the acquisition of each emission-producing entity/asset that existed during the base year will be added to the base year and each year that follows. Emissions from divestitures of assets that existed during the base year will be removed from the base year and every year that follows. Mergers and capital leases on emission-producing assets will be planned in the same manner as the acquisitions to the degree that it is practical. There are no planned adjustments for outsourcing. Mergers, acquisition, divestitures, and capital leases will be identified by ESP and integrated into the GHG inventory for the calendar year when the deal closes. Additionally, data managers should keep ESP informed of any such changes. Finally, ESP will monitor such changes through the investment approval process, which it participates in on as a subject matter expert.

Since 2000, Entergy has purchased and divested several assets. The table below shows these transactions and describes any adjustments to the base year that were required, along with a justification of such changes.

Transaction/Asset	**Year of Close**	**Year of COD**	**Comments**
Rhode Island Plant (acquisition)	2011	2002	Did not exist in base year – no adjustment needed
Harrison County Plant (divestiture)	2011	2003	Did not exist in base year – no adjustment needed
Acadia Plant (acquisition)	2011	2002	Did not exist in base year – no adjustment needed
Ouachita Plant (acquisition)	2008	2002	Did not exist in base year – no adjustment needed
Calcasieu Plant – Unit 1 (acquisition)	2008	2000	Estimated plant emissions fall well below materiality threshold (1%) – no adjustment needed
Calcasieu Plant – Unit 2 (acquisition)	2008	2001	Did not exist in base year – no adjustment needed
Perryville Plant (acquisition)	2005	2001/2	Did not exist in base year – no adjustment needed
Spindletop Gas Storage (acquisition)	2004	Pre-2000	Estimated plant emissions fall well below materiality threshold (1%) – no adjustment needed
Thermal Plant – Houston (acquisition)	2003	Pre-2000	Estimated plant emissions fall well below materiality threshold (1%) – no adjustment needed
Thermal Plant – NOLA (acquisition)	2000	Pre-2000	Estimated plant emissions fall well below materiality threshold (1%) – no adjustment needed

Adjustment for Methodology Changes - Changes will be made to calculations and emissions factors only if justified by regulatory changes, scientific/engineering judgment, or updates to the various protocols employed. The Director, Corporate Environmental Programs will make the final decision as to whether or not make such adjustments. In cases where changes are made, the changes will be made to all years in the inventory, including the base year, so that all emissions are reported using the same basis for all years.

An **IMPRD Revision Log** is included in this document as Attachment 3 and should be used to document any structural or methodological changes to corporate greenhouse gas inventories or this IMPRD.

Management Tools

Roles and Responsibilities

The Director, Corporate Environmental Programs is responsible for overall GHG program management and external reporting. This individual is also responsible for compiling the data required to update the GHG inventory on an annual basis before the end of Q1 and for evaluating the reasonableness of the GHG data.

The Vice President, Environmental Strategy and Policy reviews changes to the programs that Entergy participates in and updates the IMPRD as needed. These responsibilities are defined in more detail in specific sections of this IMPRD. ESP then produces and distributes needed reports summarizing the emissions inventory and progress toward the goal.

ESP also provides guidance and feedback to relevant company Managers and Directors on what sources to include in the inventory, what data to use and collect, and what emissions factors are most appropriate.

Various Managers and Directors around the company are responsible for maintaining the data necessary to complete the inventory and subsequent updates. Entergy's Environmental Leadership Team (ELT) reviews and approves the summary of each year's data.

Communication

The IMPRD will be communicated upon initial finalization and subsequently on a periodic basis, when major revisions occur or as needed. Opportunities for communication with Data Managers include when training is delivered, when data requests are made and when the IMPRD is revised.

Training

Entergy currently has no training materials available regarding GHG management or inventory. Training will be delivered on an ad hoc basis to employees involved in the process. The Manager, Corporate Environmental Operations will conduct this training as needed.

Document Retention and Control Policy

Entergy's GHG management program and all relevant records and documentation should be managed in accordance with Entergy's Records Management & Retention Policy. Entergy's SENet will serve as the final publication repository for the GHG inventory. SENet is accessible by all employees through any computer connected to the internal network. Additionally, the annual inventory, verification statement and IMPRD will be submitted to the American Carbon Registry for posting on Entergy's registry account. This is accessible to anyone via the ACR website (www.americancarbonregistry.com).

Data verification and documentation is essential for the authenticity of this program. To maintain a high standard, all records verifying the GHG inventories and registry contents will be maintained by ESP for a minimum of three years. Documentation of GHG reduction project expenditures and project close-out reports shall also be maintained for a minimum of three years.

Auditing and Verification

Internal Auditing

Internal auditing of the GHG program will be conducted by ESP staff or designee. Some of the data used to develop emission estimates are also audited through Entergy's Safety and Environment Audit Program (i.e., CEMS data/processes) administered by ESP. Findings related to the GHG Inventory will be provided to the VP, ESP who will determine the responsible individual for each finding's corrective action. The audit will include a review of the IMPRD and the latest version of the inventory. A consistency check is also performed against the prior year's data, especially in the area of direct emissions. Changes to the IMPRD driven by audit results will also be entered into the IMPRD Revision Log (Attachment 3).

External Validation and/or Verification

Entergy is committed to an external third-party audit of the GHG baseline/inventory data, calculations, and records. This third-party verification of the program will be conducted at least every other year, including 2006 and the goal year. Since 2006, Entergy has sought annual, third-party verification of the GHG Inventory. The verification statement and report are made available via the ACR website and SENet.

In 2012, Entergy decided to elevate this third-party verification audit to the ISO standard for GHG Inventory preparation and verification (ISO 14064). This is an expanded verification effort that requires a higher level of scrutiny, additional data review/evaluation. The verification report will include additional details and statements regarding the type of verification, level of assurance and an uncertainty analysis. This IMPRD and Entergy's 2011 GHG Inventory are verified in accordance with ISO 14064-3 at a LIMITED Level of Assurance.

Management Review

The GHG emissions summary data will be reviewed and approved annually by the ELT. Goal setting, progress toward meeting goals, and any additional action or options necessary to meet the goals will be covered in this management review. The VP, ESP will verify that the information has been reviewed and found to be substantially compliant with this IMPRD. Additionally, this information will be presented to our Safety and Environmental Executive Forum and to the Audit Committee of the Board of Directors during our annual reporting cycle.

Corrective Action

Any findings identified through QA/QC and internal and external reviews related to the greenhouse gas inventory or IMPRD are assigned to the appropriate Manager or Director for action by the VP, ESP. The VP, ESP will maintain a list of identified gaps related to the program, the person that is responsible for closing the gap, and the required timing for gap closure. Changes to the IMPRD driven by this process will also be entered into the IMPRD Revision Log (Attachment 3).

Any findings identified through QA/QC and internal and external audits related to the GHG emission inventory, calculations, or reporting are assigned to the VP, ESP or his designee.

Voluntary Commitment and Reduction Efforts

Voluntary Commitments

In May 2001, Entergy publicly committed to stabilize CO_2 emissions from its power plants at year 2000 levels through 2005, and dedicated $25 million in supplemental corporate funding to achieve this target over the five-year period. This commitment was focused on CO_2 emissions from fuel combustion at the company's power plants and requires that Entergy:

- Stabilize CO_2 emissions from its U.S. power plants at year 2000 levels through 2005.
- Establish the $25 Million Environmental Initiatives Fund (EIF) in support of achieving the 2001-2005 stabilization targets.
- Document activities and annual report progress.
- Employ an independent third party organization to verify measurement of Entergy's CO_2 emissions from U.S. power plants.

Entergy completed this first commitment 23 percent below year 2000 levels.

Entergy's second commitment, made in 2005, included:

- Stabilize CO_2 emissions from all Entergy operations at 20% below 2000 levels through 2010.
- Commit funding of $3.25 million in support of achieving the 2005-2010 target.
- Document activities and annually report progress.

Entergy completed this second commitment more than three percent below the target. On a cumulative basis, Entergy bettered the two commitments by over 14 percent.

In 2011, Entergy once again renewed its commitment to stabilize GHGs with a third commitment:

- Stabilize CO_2 emissions from all Entergy operations at 20% below 2000 levels through 2020.

- Commit funding of $10 million in support of achieving the 2011-2020 target.
- Document activities and annually report progress.

Additional information on these commitments can be viewed on Entergy's website.

Voluntary Reductions

Since 2001, Entergy has invested in various types of internal and external emission reduction projects. These projects range from internal plant efficiency improvements, to reforestation projects, to carbon offset purchases. These projects are described annually in the Environmental Section of Entergy's Sustainability Report.

In addition to the projects described above, Entergy owns several facilities that generate electricity without emission of GHGs. Entergy's nuclear fleet (10,101 MW), wind farms (80 MW) and hydro plants (74 MW) generate virtually emission free electricity and constitute a major portion of Entergy's overall generation mix (approximately 36.5% at the end of 2010) [Source – Entergy's 2010 Statistical Report].

Attachment 1

2011 GHG Inventory – FINAL

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)	CO2 from CEM: Entergy equity share of unit CO2 emissions	CH4: Entergy share CH4 emissions from generation (2)	N2O: Entergy share N2O emissions from generation (3)	Total Facility CO2e in short tons	Total CO2e in metric tons
						short tons CO2	short tons CO2	short tons CO2e	short tons CO2e		
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	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. 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**	1,864,713	
BiFuel-Gasoline/Ethanol	**S**	255,855	
BiFuel-Gasoline/CNG	**A**	32,981	
BiFuel-Gasoline/LPG	**B**	3,400	
BiFuel-Diesel/Electricity	**F**	6,125	
Propane	**P**	55	
CNG	**C**	121	
LPG	**L**	100	
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)	Unit-Specific Emission Factor (lbs CO2/MWh) [from eGRID2010 (v1.1 - 2007 data)]	CO2 emissions from puchased power (short tons) [using eGRID Unit-Specific Factors (when available)]	Comments/Notes
[redacted]						12,352.5	[redacted]
						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.

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: EPA emission factor (kg CO2/MMBtu (HHV)*	CO2 Emissions -- kg: EPA emission factor (kg CO2/mass or volume unit)	CO2 Emissions -- kg: EPA emission factor (kg CO2/mass or volume unit)	CO2 Emissions -- lbs: EPA emission factor (lbs CO2/MMBtu (HHV)*	CO2 Emissions -- lbs: EPA emission factor (lbs CO2/mass or volume unit)	CO2 Emissions -- lbs: EPA emission factor (lbs CO2/mass or volume unit)	CH4 Emissions: EPA emission factor (g CH4/MMBtu)	CH4 Emissions: EPA emission factor (kg **CO2e**/MMBtu) GWP=21	CH4 Emissions: EPA emission factor (lbs **CO2e**/MMBtu)	CH4 Emissions: CH4 (**CO2e**) emissions factor (**lbs** CO2e CH4/**lb** CO2)	N20 Emissions: EPA emission factor (g N20/MMBtu)	N20 Emissions: EPA emission factor (kg **CO2e**/MMBtu) GWP=310	N20 Emissions: EPA emission factor (lbs **CO2e**/MMBtu)	N20 Emissions: 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	1.8 (ind)	0.038	0.083	0.0005	.54 (ind)	0.1674	0.369	0.0023
										2.7 (elect gen)	0.057	0.125	0.0008	.54 (elect gen)	0.1674	0.369	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)	0.038	0.083	0.0005	1.8 (ind)	0.1674	0.369	0.0021
										2.7 (elect gen)	0.057	0.125	0.0007	2.7 (elect gen)	0.1674	0.369	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								
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)	0.100	0.220	0.0019	0.095 (ind)	0.029	0.065	0.0006
										0.95 (elect gen)	0.020	0.044	0.0004	.095 (elect gen)	0.029	0.065	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)	0.210	0.463	0.0022	1.4 (ind)	0.43	0.96	0.0046
										1.0 (elect gen)	0.021	0.046	0.0002	1.4 (elect gen)	0.43	0.96	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									
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	1 (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									
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		
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 GWPa		
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.

Attachment 2

Entergy Corporation General Emissions Source Checklist

(completed in 2005 during initial inventory development phase)

Entergy Corporation General Emission Source Checklist

(completed in 2005 during initial inventory development phase)

Emissions source category	GHG	Emissions source	Data Source/Comments
Direct emissions			
		Stationary Combustion	
Fossil fuels	CO_2	Boilers	CEMS data from Fossil Environmental Support Group
		Emergency/Backup Generation and other Small Sources	An inventory of all potential emission sources at Entergy locations was performed in 1994. The package of information for each Fossil site that includes a summary table of potential emission sources and maximum heat input for each non-boiler combustion source. This information was supplemented by information in air permits.
		cogeneration	RS Cogen is the only cogeneration plant in Entergy. CEMS data for this site is available from public sources. Ownership share was accounted for.
	CH_4	CH_4 from stationary combustion	Calculated from CEMS data
	N_2O	N_2O from stationary combustion	Calculated from CEMS data
		Mobile Combustion	
Fossil Fuels	CO_2	employee transportation in company vehicles	See spreadsheet for fuel activity by year, mileage driven by year, number of vehicles by type (car, light truck, heavy trucks, etc.) and by fuel. These data, along with emission factors, were used to estimate emissions from these sources. Source is Entergy's Manager of Transportation
		company service vehicles	
	CH_4	CH_4 from mobile combustion	
	N_2O	N_2O from mobile combustion	
		Fugitive Emissions	
Gas Distribution System Line Losses	CH_4	Leaks in or venting of gas distribution system in New Orleans and Baton Rouge	Lost and Unaccounted for Gas (LUFG) for 2000 - 2004 from the Statistical Report is one source of this data; however, it may not be accurate enough. Subsequently, an alternative equipment-based calculation was used for estimating emissions (see below) Gas Distribution Operations provided these data and they can also be found in the Statistical Report. (Line Losses (LUFG)) - Mike Leger - Manager, Gas Distribution Operations Support (8-567-3579) Basically, these numbers represent the starting inventory + purchases -

Entergy Corporation General Emission Source Checklist

(completed in 2005 during initial inventory development phase)

			sales. However, it is likely that the majority of this is attributed to meter inaccuracy, company uses, and other factors which introduce uncertainty. Entergy's Gas Distribution Operations Support Manager, estimates that at most, 30% of these numbers represent actual, physical losses. An equipment-based quantification methodology was used for these emissions. Mike Leger also provided a spreadsheet that contains a list of gas distribution assets (miles of pipe and what type, number of meters, etc.) and Platts used a GRI protocol to develop emission estimates. Manager, Gas Distribution Operations.
T&D Equipment Gas Loss	SF_6	Leakage of SF_6 from certain types of T&D equipment	2003 1605(b) report SF_6 Management Program – T&D Environmental Management provided 2004 emissions 1997 - 1082.42 lbs 1998 - 649.62 lbs 1999 - 649.62 lbs 2000 – NO DATA 2001 – NO DATA 2002 - 30,360 lbs 2003 – NO DATA 2004 – 22700 lbs T&D Environmental Management has developed a protocol to derive these emissions.
Cooling Operations	HFC	Building cooling/air conditioning	Owned square footage: 2,578,000 Capital leased square footage: 830,000 These numbers do not include power plants, estimate 25,000 - 50,000 square feet per power plant Source is Manager, Real Estate
		Mobile air conditioning	Derived from vehicle usage information – see item above. Emission factor used to estimate HFC emissions from this source
		District Cooling Operations	Information regarding equipment/coolant ratings and capacities obtained from the Director, Thermal Operations. Emission factors used to estimate emissions.
Indirect Emissions			
Fossil Fuels	CO_2	purchased electricity	2000 – 24.05 million MWh 2001 – 19.32 million MWh 2002 – 27.16 million MWh 2003 – 37.57 million MWh (Controllable = 6.61; balance is UC) 2004 – 38.05 million MWh (Controllable = 9.23; balance is UC) Information regarding specific sources of purchased power was not tracked in 2000 - 2002; therefore, unit-specific data required to calculate emissions is not available for this timeframe. However, unit-specific data is available for 2003 and 2004. All of this information obtained from System Planning and Operations
	CH_4	purchased electricity	
	N_2O	purchased electricity	
Transmission and Distribution	CO_2	Losses from electricity T&D for purchased power only	USEPA/Climate Leaders is currently developing a protocol to calculate these emissions. Currently, this is not included in Entergy's GHG inventory.
Green power		Purchased Green Power (non-biomass)	2000 - 488,922 MWh In 2000, Entergy owned and operated 3 hydro facilities totaling 150 MW. Additionally, Entergy purchased power from other hydro assets…this total is shown. This information was obtained from Entergy's 1605(b) report.

Attachment 3

IMPRD Revision Log

Entergy GHG IMP and Reporting Document Revision Log

Revision No	Revision Date	Reason for Revision	Additional Comments
1	July 2005	Original DRAFT	
2	8/16/05	Revised Draft	Editorial/technical comments from Fossil Operations, Nuclear Operations, and T&D included
3	9/30/05	FINAL DRAFT	Editorial/technical comments from Platts/E-source
4	12/21/05	FINAL VERSION	Changes made to reflect approved GHG reduction goal – 2nd commitment
5	10/10/06	Revised based on comments from Climate Leaders and E-source	Clarified various data sources and communication requirements in document
6	04/28/09	Revsied based on findings during verification of 2006 and 2007 GHG Inventories	Various editorial changes; added Thermal facilities and Spindletop to facilities list
7	08/25/09	Revised based on findings during verification of 2008 GHG Inventory	Revised fugitive emissions methodology for SF_6; other minor editorial changes
8	04/01/10	Revised based on findings during verification of 2009 GHG Inventory	Various editorial changes; noted need to subtract EAM from total purchases (ISB); updated facility list; enhanced QA/QC discussion
9	3/10/11	Revised based on findings during verification of 2010 GHG Inventory	Various editorial changes; updated status of EPA Climate Leaders Program; clarified review requirements, QAQC measures and training
10	03/09/12	Revised to comply with ISO 14064-3:2006 and based on findings during verification audit of 2011 GHG Inventory	Major revision – expanded document to include aspects necessary to comply with ISO standard. Expanded discussions of data management, quantification methods, targets, actions, base year adjustments and uncertainty.