Greenhouse Gas Inventory Management Plan and Reporting Document (IMPRD)

Entergy Corporation
New Orleans, LA

Prepared by: Rick N. Johnson (rjohn15@entergy.com)
Director, Environmental Strategy & Policy
Environmental Strategy & Policy Group

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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 required 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 annually 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 14064-3:2006).

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.

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 emissions, including small sources, for reporting externally. Entergy registers its emissions and offset purchases to the American Carbon Registry (www.americancarbonregistry.org) and posts the GHG Inventory, along with this document, on the company's website (www.entergy.com).

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, including nearly 9,000 megawatts of nuclear power. Entergy delivers electricity to 2.9 million utility customers in Arkansas, Louisiana, Mississippi, and Texas. Entergy has annual revenues of approximately $11 billion (2017) and more than 13,000 employees. Additional company information can be located at www.entergy.com.

Company address:	639 Loyola Avenue New Orleans, Louisiana 70113
IMPRD/GHG Inventory Contact:	Chuck Barlow – Vice President, Environmental Strategy & Policy Environmental Strategy & Policy (ESP) Group (504) 576-4000 cbarlow@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 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 some emissions associated with the electricity purchased to support grid operations and meet customer demand. The GHG emissions resulting from the full life cycle of the various fuel sources are not included in the inventory.

Other emission sources 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.

Some emission sources require reporting under EPA's Mandatory GHG Reporting Rule. These emissions are included for the previous calendar year due to the timing of the reporting cycle. The methodology for calculation of these categories is the same as is required under this EPA reporting program.

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 emissions-producing assets are assumed to be 100% owned by Entergy.

List of GHGs Included – Entergy includes the following GHG gasses associated with 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)

Perfluorocarbons and Nitrogen Trifluoride are not included in Entergy's inventory given the nature of its business and that this class of chemicals is not used in any of Entergy's operations in any sizeable amount.

Entergy Corporation Emission Sources

Process for Identifying Emissions Sources – A spreadsheet was created by Platts/E source as contractors to EPA's Climate Leaders program, and was utilized as an overall roadmap to help identify GHG emission sources at Entergy locations. Within each category, 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 (updated annually) and its sources are shown in Attachment 1 and summarized in the sections below. Additionally, this information was further refined and updated based on data submitted to the EPA for the mandatory GHG reporting rule beginning 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, including corporate aircraft.
- 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 mobile air conditioning sources (vehicles).

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 some 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 1. All electricity consumed in the operation of the utility 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. However, electricity consumed by the wholesale generation plants and associated facilities is accounted for separately in the inventory. 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 some 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 some of these emissions because it has decreased its self-generation while increasing the amount of power it purchases. Beginning in 2014, employee commuting and customer combustion of the company's product (natural gas) were added to the inventory. Other optional sources such as

employee business travel and full lifecycle/supply chain emissions 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 (a technical consultant working for EPA as a part of the Climate Leaders Program) staff and approved by EPA Climate Leaders staff – these methodologies were carried forward in future inventory years, unless supplanted by an updated method. 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 were reviewed and approved by EPA Climate Leaders staff and subsequently verified by a third-party. 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 GHG Protocol and AP-42), US DOE, and EPA's eGRID system; these factors are updated as needed. The quantification methodologies, emission factors and their sources can be found in the GHG inventory calculation spreadsheets, accessible through Entergy's external website (http://www.entergy.com/environment/performance.aspx). 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 2016, this category represented 87.0% of the corporate total.

Source: This GHG emissions data is reported to the ESP Group by Entergy's Fossil Environmental Support Group quarterly.

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 compiled by facility 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. Similarly, an inventory of small sources also was conducted at the Nuclear facilities in 2005 – these numbers are carried forward from year-to-year.

Beginning in 2011, Entergy reported small sources at the Fossil plants to the EPA under the mandatory GHG reporting rule Subpart C. These numbers were used beginning with the 2011 inventory in order to align regulatory reporting with this voluntary inventory. Changes to the overall number were not material. In 2017, this category represented 0.4% 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 is updated with 2017 data and used to calculate GHG emissions for this equipment category. In 2017, this category represented 0.1% of the corporate total. Entergy decided not to include GHG emissions resulting from employee business travel; 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 and the Aviation Group.

Fugitive Emissions: Methane – 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. 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 2017, this category represented 0.2% 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 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. Additionally, vehicle HFC emissions were also estimated in a similar manner. Conservative estimates were completed for all sources of HFC emissions; this category of emissions was determined to be *de minimus*. In 2016, these categories represented <0.1% of the corporate total. PLEASE NOTE: Entergy's district cooling/thermal operations were sold to a third-party in December of 2013. Due to the *de minimus* nature of emissions associated with these assets, no adjustments were made to the 2013 inventory; however, these assets were removed from the inventory beginning in 2014. 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 Manager, Transportation.

Fugitive Emissions: SF_6 – This category of emissions includes operational and unintentional releases of SF_6 used in electricity transmission equipment. Emissions of this gas were previously estimated using a protocol similar to the

protocol utilized for EPA's SF_6 Emission Reduction Partnership Program. However, beginning in 2014, the methodology was updated to be consistent with the EPA Mandatory GHG Reporting Rule. This category is reported under Subpart DD of this rule; the number included in this inventory represents the number reported under this compliance program. The emission estimate provided is from calendar year 2016 and this category represented 0.5% 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.

For de minimus fugitive emission categories described above, a consistent quantity of emissions is included in the inventory and will be carried forward annually; However, SF6 emissions will be updated annually.

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 and 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 it is assumed that 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.

Beginning in 2013, an estimate of emissions associated with off-site electricity usage of the generation plants (and associated facilities) was included in the inventory.

Optional Emissions

Purchased Power – This category of emissions includes some of the emissions 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 and an actual buying decision is made by Entergy (controllable or unit-contingent purchases). The remaining sources of purchased power are either not known (non-controllable or grid purchases) or cannot be controlled for some other reason (i.e., Qualifying Facility Puts [QF Puts] under PURPA). Under the EPA and WRI protocols, including emissions from power purchased by utilities is optional. From 2000 to 2013, Entergy opted to include all purchased power in its GHG inventory and subsequent tracking; however, beginning in 2014, Entergy does not include non-controllable purchases in the inventory. Non-controllable purchases are those that do not meet the definition of a controllable purchase (i.e., the source is unknown OR there is no buying decision made regarding the power). In December of 2013, Entergy transitioned into the Midwest Independent System Operator (MISO) system. As a result, there is a large decrease in the amount of controllable purchases (roughly half). Additionally, there is no mechanism for knowing from which plant/unit the power purchases from MISO are sourced. Accordingly, beginning in 2014, only purchases made under long-term contracts and other bilateral arrangements are included in the inventory. This approach avoids the potential for double counting, as some of the power purchased to serve Entergy load may actually be generated by company-owned assets already accounted for in the direct emissions category described in previous sections. In 2017, this category represented 9.4% of the corporate total.

Controllable purchase information (in terms of millions of megawatt-hours) was collected. Supplier and unit-specific emission rate information from eGRID, where available, was used to develop a supplier-specific custom CO_2 emissions factor (regional emission factors were used for other GHGs). If supplier-specific GHG emission factors were not available, the regional grid factor from eGRID was used as a default.

Source: All data regarding power purchases (TRADES database and ISB system) 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.

Product Combustion – This optional category of emissions includes combustion of the natural gas distributed to customers in Baton Rouge and New Orleans, the only areas of the service territory where Entergy distributes natural gas to retail customers. Entergy began including these emissions in the 2014 inventory to be consistent with the EPA Mandatory GHG Reporting Rule. This category is reported under Subpart NN of this rule; the number included in this inventory represents the number reported under this compliance program. The emission estimate provided is from calendar year 2013. In 2017, this category represented 2.1% of the corporate total.

Source: All data regarding this category is sourced from the Manager, Gas Operations.

Employee Commuting – This optional category of emissions was estimated using employee survey data collected in 2014 and using EPA methodologies for Scope 3 emission estimations and emission factors. The full calculation methodology is shown on the appropriate spreadsheet of Attachment 1. In 2016, this category represented 0.1% of the corporate total. Accordingly, this is a *de minimus* category that will be carried forward annually.

Source: Survey data was provided by Corporate Communications.

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 87.0% of total corporate emissions in 2017) 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 Director, Environmental Strategy & Policy (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 long-term power purchase contracts necessary to support grid operations. Additionally, the ISB system is used to track the final settlement of power purchases. Where there were discrepancies in the data, the ISB system was used as the correct value. Other data categories are managed as described in the section above.

Entergy transitioned system dispatch and the bulk of power purchasing operations to MISO on December 19, 2013. This transition greatly impacts the manner in which power is purchased and dispatched for Entergy. Beyond the long-term power purchase contracts described above, all power necessary to support grid operations is purchased directly from MISO. The source plant/unit of this power is not known and may in fact include power generated by Entergy.

Data Management

All data required for the inventory is either reported to or collected by the Director, Environmental Strategy & Policy in the ESP Group in the December/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 ESP's SharePoint site, Entergy's intranet site for all information maintained by ESP. 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) and on Entergy's external website (http://www.entergy.com/environment/performance.aspx). 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 current 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 also is reviewed and all calculations validated 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. The shared directory is only accessible by employees in the ESP group. Entergy's external website (www.entergy.com) 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 using read-only, redacted versions.

Frequency

Data will be reported to/collected by ESP on an annual basis (at a minimum). 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 14064.3. 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 material mergers, acquisitions, and divestitures that occur during the reporting time frame for the goal. Actual yearly emissions the acquisition of each material 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 material emission-producing assets that existed during the base year will be removed from the base year and every year that follows. Mergers and capital leases on material 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 for environmental issues.

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**
Union Plant (acquisition)	2016	2003	Did not exist in base year – no adjustment needed
Top of Iowa Windfarm (divestiture)	2016	2003	No emissions from these assets – did not exist in base year – no adjustment needed
White Deer Windfarm (divestiture)	2016	2003	No emissions from this asset – did not exist in base year – no adjustment needed
Ninemile 6 – NOLA (new self-build CCGT)	NA	2014	Did not exist in base year – no adjustment needed
Thermal Plant – Houston (divestiture)	2013	Pre-2000	Estimated plant emissions fall well below materiality threshold (1%) – no adjustment needed
Thermal Plant – NOLA (divestiture)	2013	Pre-2000	Estimated plant emissions fall well below materiality threshold (1%) – no adjustment needed
Hinds County Plant (acquisition)	2012	2001	Did not exist in base year – no adjustment needed
Hot Spring Plant (acquisition)	2012	2002	Did not exist in base year – no adjustment needed
Rhode Island Plant (acquisition)	2011	2002	Did not exist in base year – no adjustment needed

Rhode Island Plant (divestiture)	2015	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
Attala Plant (acquisition)	2003	2001	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. As an example, several emission factors were updated in 2014 due to adjustments made by EPA. The Vice President, Environmental Strategy & Policy 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 Vice President, Environmental Strategy & Policy 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.

He/she also 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, during the third-party review of the inventory, 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 Director, Environmental Reporting & Climate (or designee) 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 external website will serve as the final publication repository for the GHG inventory. The external website is accessible via the internet. 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, reporting under the Mandatory Reporting Rule, etc.) 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 Entergy's external website.

In 2012, Entergy decided to elevate this third-party verification audit to the ISO standard for GHG Inventory preparation and verification (ISO 14064.3). This is an expanded verification effort that requires a higher level of scrutiny and additional data review/evaluation. The verification report will include a statement regarding the type of verification, level of assurance and an uncertainty analysis. The uncertainty analysis identifies, describes and quantifies the largest sources of uncertainty for the GHG Inventory. See Attachment 2 for the full verification report.

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 the Audit Committee of the Board of Directors during the 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 required 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 annually 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 Integrated Report.

In addition to the projects described above, Entergy owns several facilities that generate electricity without emission of GHGs. Entergy's nuclear fleet (9,000 MW), hydro plants (74 MW), and solar PV facilities (2.5 MW) generate virtually emission-free electricity and constitute a major portion of Entergy's overall generation mix (more than 30% at the end of 2017).

Attachment 1

2017 GHG Inventory – FINAL and VERIFIED

2017 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	35,903,382	32,571,000	87.1%	Stationary Combustion CEM
			CH4	14,234	12,913	0.0%	Stationary Combustion CEM
			N2O	79,510	72,130	0.2%	Stationary Combustion CEM
		Small stationary combustion sources (co-located at generation stations and stand alone units)	CO2, CH4, N2O	167,743	152,174	0.4%	All small stat cbn totals
		Biomass power generation	CO2	0	0	0.0%	NA
	Mobile Combustion	Corporate fleet	CO2	51,557	46,771	0.1%	Mobile Combustion
			CH4	76	69	0.0%	Mobile Combustion
			N2O	404	366	0.0%	Mobile Combustion
		Biomass fleet	CO2	0	0	0.0%	NA
	Fugitive Emissions	Natural gas transmission and distribution	CH4	76,352	69,265	0.2%	Fugitive CH4-NG T&D
		Electricity transmission and distribution	SF6	226,227	205,229	0.5%	Fugitive SF6
		Cooling/air-conditioning (building, mobile and nuclear cooling eqpt)	HFCs	6,161	5,589	0.0%	Fugitive HFCs
	Process emissions	none applicable	NA	0	0	0.0%	NA
Total Emissions from Direct Sources				**36,525,645**	**33,135,508**	**88.6%**	
Indirect Emission Sources	Purchased Electricity	Power purchased for business operations outside Entergy service territory	CO2	36,446	33,063	0.1%	Purchased power
	T&D losses	Entergy purchased power consumed on Entergy T&D system	CO2, CH4, N2O	132,989	120,645	Note: these emissions are included within the Optional emissions	Purchased power
Total Emissions from Indirect Sources				**169,434**	**153,708**		
Optional Emissions Sources	Purchased power (controllable)	Controllable purchased power sold to customers	CO2, CH4, N2O	3,770,163	3,420,234	9.1%	Purchased power
	Purchased power (uncontrollable)	Uncontrollable purchased power sold to customers	CO2, CH4, N2O	*Not Applicable beginning in 2014 - See *** Note at the bottom of the Purchased power tab*			
	Product combustion	Combustion of natural gas distributed to customers (Scope 3 for Entergy, Scope 1 for customers)	CO2, CH4, N2O	854,344	775,048	2.1%	Natural Gas Combustion
	Employee Commuting	Estimation of emissions resulting from employee commutes	CO2, CH4, N2O	51,557	46,772	0.1%	Employee Commuting
Total Emissions from Optional Sources				**4,676,063**	**4,242,053**	**11.3%**	
GHG Stabilization Commitment Total (progress toward third GHG commitment)				**39,841,288**	**36,143,408**	**96.6%**	
Total Corporate emissions				**41,238,154**	**37,410,624**	**100.0%**	

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

2017

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 (Unit 2)	CT3	580	LA	100%	Natural Gas	555,406.40	555,406.40	261.04	311.03		
Acadia (Unit 2)	CT4		LA	100%	Natural Gas	570,156.50	570,156.50	267.97	319.29		
Totals							1,125,562.90	529.01	630.32	1,126,722.23	1,022,145.21
Attala	A01	480	MS	100%	Gas/Oil	504,875.00	504,875.00	237.29	282.73		
Attala	A02		MS	100%	Gas/Oil	502,065.70	502,065.70	235.97	281.16		
Totals		480					1,006,940.70	473.26	563.89	1,007,977.85	914,422.12
Baxter Wilson	1	550	MS	100%	Gas/Oil	421,607.90	421,607.90	198.16	236.10		
Baxter Wilson	2	771	MS	100%	Gas/Oil	4,973.04	4,973.04	2.34	2.78		
Totals		1321					426,580.94	200.49	238.89	427,020.32	387,386.32
Big Cajun 2[5]	2B3 (3)	257	LA	42%[5]	Coal	3,760,360.60	1,579,351.45	426.42	7,991.52		
Totals		257					1,579,351.45	426.42	7,991.52	1,587,769.40	1,440,400.17
Calcasieu Plant	GTG1	322	LA	100%	Natural gas	172,173.39	172,173.39	80.92	96.42		
Calcasieu Plant	GTG2		LA	100%	Natural gas	60,854.48	60,854.48	28.60	34.08		
Totals		322					233,027.87	109.52	130.50	233,267.89	211,617.07
Gerald Andrus	1	761	MS	100%	Gas/Oil	287,708.88	287,708.88	135.22	161.12		
Totals		761					287,708.88	135.22	161.12	288,005.22	261,273.94
Hinds Energy Facility	H01	456	MS	100%	Gas CT	670,482.90	670,482.90	315.13	375.47		
Hinds Energy Facility	H02		MS	100%	Gas CT	665,199.40	665,199.40	312.64	372.51		
Totals							1,335,682.30	627.77	747.98	1,337,058.05	1,212,958.66
Hot Spring Energy Facility	CT-1	620	AR	100%	Gas CT	666,890.09	666,890.09	313.44	373.46		
Hot Spring Energy Facility	CT-2		AR	100%	Gas CT	672,696.74	672,696.74	316.17	376.71		
Totals							1,339,586.83	629.61	750.17	1,340,966.60	1,216,504.44
Independence	1	472	AR	56.5%	Coal	3,224,689.75	1,821,949.71	491.93	9,219.07		
Independence	2	332	AR	39.37%	Coal	4,765,083.35	1,876,013.31	506.52	9,492.63		
Totals		804					3,697,963.02	998.45	18,711.69	3,717,673.17	3,372,616.37
Lake Catherine	4	547	AR	100%	Gas/Oil	76,197.45	76,197.45	35.81	42.67		
Totals		547					76,197.45	35.81	42.67	76,275.93	69,196.36
Lewis Creek	1	260	TX	100%	Gas/Oil	460,185.92	460,185.92	216.29	257.70		
Lewis Creek	2	260	TX	100%	Gas/Oil	560,468.33	560,468.33	263.42	313.86		
Totals		520					1,020,654.25	479.71	571.57	1,021,705.52	926,875.66
Little Gypsy	1	244	LA	100%	Gas/Oil	0.00	0.00	0.00	0.00		
Little Gypsy	2	436	LA	100%	Gas/Oil	556,675.36	556,675.36	261.64	311.74		
Little Gypsy	3	573	LA	100%	Gas/Oil	888,591.24	888,591.24	417.64	497.61		
Totals		1253					1,445,266.60	679.28	809.35	1,446,755.22	1,312,474.26
Michoud	1	113	LA	100%	Gas/Oil	0.00	0.00	0.00	0.00		
Michoud	2	244	LA	100%	Gas/Oil	0.00	0.00	0.00	0.00		
Michoud	3	561	LA	100%	Gas/Oil	0.00	0.00	0.00	0.00		
Totals		918					0.00	0.00	0.00	0.00	0.00
Ninemile Point	3	135	LA	100%	Gas/Oil	0.00	0.00	0.00	0.00		
Ninemile Point	4	748	LA	100%	Gas/Oil	1,120,474.93	1,120,474.93	526.62	627.47		
Ninemile Point	5	763	LA	100%	Gas/Oil	1,616,497.29	1,616,497.29	759.75	905.24		
Ninemile Point	6A	280	LA	100%	CCGT	794,217.90	794,217.90	373.28	444.76		
Ninemile Point	6B	280	LA	100%	CCGT	794,515.50	794,515.50	373.42	444.93		

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
Totals		1646					4,325,705.62	2,033.08	2,422.40	4,330,161.10	3,928,256.07
Ouachita Power	CTGEN1	789	LA	100%	Natural gas	661,633.54	661,633.54	310.97	370.51		
Ouachita Power	CTGEN2		LA	100%	Natural gas	514,318.15	514,318.15	241.73	288.02		
Ouachita Power	CTGEN3		LA	100%	Natural gas	501,419.31	501,419.31	235.67	280.79		
Totals		0					1,677,371.00	788.36	939.33	1,679,098.69	1,523,252.71
Perryville	1-1	718	LA	100%	Gas/Oil	397,915.10	397,915.10	187.02	222.83		
Perryville	1-2		LA	100%	Gas/Oil	377,089.50	377,089.50	177.23	211.17		
Perryville	2-1		LA	100%	Gas/Oil	42,116.16	42,116.16	19.79	23.59		
Totals		0					817,120.76	384.05	457.59	817,962.39	742,043.00
R S Cogen[4]	RS-5	425	LA	50%	Natural gas	836,609.41	418,304.71	196.60	234.25		
R S Cogen[4]	RS-6		LA	50%	Natural gas	834,093.60	417,046.80	196.01	233.55		
Totals		425					835,351.51	392.62	467.80	836,211.92	758,598.69
R S Nelson	4	500	LA	100%	Gas/Oil	0.00	0.00	0.00	0.00		
R S Nelson[6]	6	385	LA	80.9%	Coal	3,351,782.21	2,711,591.81	732.13	13,720.65		
Totals		885					2,711,591.81	732.13	13,720.65	2,726,044.59	2,473,026.05
Rex Brown	3	349	MS	100%	Gas/Oil	3,069.93	3,069.93	1.44	1.72		
Rex Brown	4		MS	100%	Gas/Oil	148,701.66	148,701.66	69.89	83.27		
Totals		0					151,771.59	71.33	84.99	151,927.91	137,826.69
Sabine	1	230	TX	100%	Gas/Oil	205,642.78	205,642.78	96.65	115.16		
Sabine	2	230	TX	100%	Gas/Oil	0.00	0.00	0.00	0.00		
Sabine	3	420	TX	100%	Gas/Oil	428,081.52	428,081.52	201.20	239.73		
Sabine	4	530	TX	100%	Gas/Oil	929,968.04	929,968.04	437.08	520.78		
Sabine	5	480	TX	100%	Gas/Oil	689,011.12	689,011.12	323.84	385.85		
Totals		1890					2,252,703.46	1,058.77	1,261.51	2,255,023.74	2,045,723.13
Sterlington	7AB	102	LA	100%	Gas/Oil	4,430.51	4,430.51	2.08	2.48		
Sterlington	7C	101	LA	100%	Gas/Oil	4,430.51	4,430.51	2.08	2.48		
Totals		203					8,861.01	4.16	4.96	8,870.14	8,046.85
Union Power Station[7]	CT 1	495	AR	100%	Gas	515,132.80	515,132.80	242.11	288.47		
Union Power Station	CT 2		AR	100%	Gas	506,250.60	506,250.60	237.94	283.50		
Union Power Station	CT 3	495	AR	100%	Gas	306,359.40	306,359.40	143.99	171.56		
Union Power Station	CT 4		AR	100%	Gas	311,794.40	311,794.40	146.54	174.60		
Union Power Station	CT 5	495	AR	100%	Gas	513,828.90	513,828.90	241.50	287.74		
Union Power Station	CT 6		AR	100%	Gas	535,234.70	535,234.70	251.56	299.73		
Union Power Station	CT 7	495	AR	100%	Gas	537,980.30	537,980.30	252.85	301.27		
Union Power Station	CT 8		AR	100%	Gas	541,748.10	541,748.10	254.62	303.38		
Totals		1980					3,768,329.20	1,771.11	2,110.26	3,772,210.58	3,422,091.87
Waterford	1	411	LA	100%	Gas/Oil	293,461.31	293,461.31	137.93	164.34		
Waterford	2	411	LA	100%	Gas/Oil	260,604.26	260,604.26	122.48	145.94		
Waterford	4		LA	100%	Oil	13,926.00	13,926.00	6.55	7.80		
Totals		822					567,991.57	266.96	318.08	568,576.60	515,804.02
White Bluff	1	465	AR	57%	Coal	5,620,905.00	3,203,917.33	865.06	16,211.82		
White Bluff	2	481	AR	57%	Coal	3,523,059.00	2,008,143.63	542.20	10,161.21		
Totals		946					5,212,060.96	1,407.26	26,373.03	5,239,841.24	4,753,504.02
Willow Glen	2	224	LA	100%	Gas/Oil	0.00	0.00	0.00	0.00		
Willow Glen	4	568	LA	100%	Gas/Oil	0.00	0.00	0.00	0.00		
Totals		792					0.00	0.00	0.00	0.00	0.00
Totals						**47,783,645.85**	**35,903,381.68**	**14,234.40**	**79,510.25**	35,997,126.32	32,656,043.68

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

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

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

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

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

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

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

Additional Notes

- Emissions from Louisiana Station Plant 1 (Units 1A, 2A, 3A, 4A, 5A) are not included in the inventory; these units exist for the sole use of Exxon under a long term lease agreement.

- The following units were removed from the Inventory in 2014 - Lynch 2&3, Couch 1&2, Lake Catherine 1-3, Louisiana Station 2 (units 10-12), Ninemile 1&2, Nelson 3, Richie 1&2, and Sterlington 10. These units are either permanently retired (decommissioned in some cases) or are in extended reserve shutdown and are not expected to return to service.

- The following units were ADDED to the inventory in 2014 - Ninemile 6A and 6B - these units came online during December of 2014.

- The Acadia power plant has two units - Unit 1 (CT1 & CT2) is owned by CLECO, while Unit 2 (CT3 & CT4 as shown above) is owned by Entergy.

Small combustion sources at all generation stations - Updated for 2016

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.

Starting in 2013, Entergy reported the previous year's GHG (CO2e) emissions from small sources co-located at Fossil plants in compliance with the EPA Mandatory Reporting Rule (General Stationary Fuel Combustion - Subpart C).

These updated values are substituted for the older, 2005 calculations in order to be consistent with mandatory GHG reporting. Nuclear estimates continue to rely on the 2005 calculations unless otherwise noted. The Thermal assets were divested in late 2013, so these assets and emission are removed from the inventory.

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

	Plant	CO2e Emissions reported under Mandatory Reporting Rule (short tons of all gases in 2016) [obtained from Power Generation unless otherwise noted]	CO2e Emissions reported under Mandatory Reporting Rule (metric tons of all gases in 2016) [obtained from Power Generation unless otherwise noted]	
	Fossil fuel generating stations			
	Atalla	0.0	0.0	
	Baxter Wilson	0.0	0.0	
	Buras	0.0	0.0	
	Calcasieu	0.0	0.0	
	Gerald Andrus	0.0	0.0	
	Harrison County	-	-	N/A - Operate ONLY - no ownership
	Hinds County	724.6	657.4	
	Hot Spring	372.8	338.2	
	Independence	1,091.8	990.5	(~50% ownership share)
	Lake Catherine	3,264.1	2,961.2	
	Lewis Creek	74,031.1	67,161.0	
	Little Gypsy	7,823.9	7,097.8	
	Louisiana Station	329.9	299.3	
	Mablevale	-	-	N/A - Decomissioned
	Michoud	0.0	0.0	
	RS Nelson	0.0	0.0	(91.4% ownership share)
	Ninemile Point	4,122.1	3,739.6	
	NISCO	-	-	N/A - Operate ONLY - no ownership
	Ouachita	65.9	59.8	
	Perryville	0.0	0.0	
	Rex Brown	633.9	575.1	
	Sabine	0.0	0.0	
	Sterlington	-	-	Below reporting threshold
	Union	-	-	No Subpart C affected sources
	Waterford 1&2	42.9	38.9	
	White Bluff	495.4	449.4	(57% ownership share)
	Willow Glen	1,198.7	1,087.5	
	Power Gen TOTAL	**94,197.2**		

Nuclear generating stations[2]	**Plant total small sources CO2e (short tons using 2005 estimate calculations)**	
Pilgrim	14,818.0	Closure expected May 31, 2019
James Fitzpatrick	1,745.0	Sale to Exelon to Closed in Q2 2017 - divided annual total in half
River Bend	687.0	
Indian Point 2	18,558.0	Slated to close in 2020
Indian Point 3	80.0	Slated to close in 2021
Palisades [1]	7,757.0	Slated to close in 2022
Waterford 3	7,042.0	
Grand Gulf	11,131.0	
Arkansas Nuclear 1&2	11,728.0	
Nuclear TOTAL (short tons)	**73,546.0**	

All small source totals	**167,743.2**

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

Note: The information below was collected and results calculated based on 2016 data.

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

Fuel Description	Fuel Code	Units consumed (gal)	Assumptions/Comments
Diesel	**D**	2,671,325	**Based on 2017 Entergy data provided by Carolanne Nichols**, it is assumed that totals for all bi-fuel categories are split at a 90/10 ratio between constituent fuel types and are calculated as such. Bi-fuels are separated below into its constituent fuel type category and emissions calculated. Green Plug-In (JEMS) units run on diesel on the highway and electricity on the job site. CNG is measured in Gallons of Gasoline Equivalency or GGE. One gallon of CNG or GGE has the same energy value as a gallon of gasoline. "Unknown" split evenly (50/50) between diesel and gasoline.
Gasoline	**G**	842,819	
BiFuel-Gasoline/Ethanol	**S**	705,341	
BiFuel-Gasoline/CNG	**A**	19	
BiFuel-Gasoline/LPG	**B**	25	
BiFuel-Diesel/Electricity	**F**	0	
Propane	**P**	77	
CNG	**C**	62	
LPG	**L**	253	
Green Plug-In JEMS	**J**	35,557	
BiFuel-Gasoline/Electricity	**H**	1,770	
Unknown	-	0	
Jet fuel		613,272	**Total 2016 Fuel Purchase - from John Shilstone**
Total gallons consumed		**4,870,520**	

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	2,706,882	0.1387	375,445	159.68	29,975	10.15	30,285
Gasoline	1,479,436	0.1251	185,077	156.44	14,477	8.81	14,367
Ethanol (E85)	70,534	0.0843	5,946	149.59	445	5.56	432
CNG	64	0.1251	8	116.41	0	See note	0
LPG	256	0.092	24	138.76	2	5.79	2
Propane	77	0.092	7	138.32	0	5.79	0
Jet fuel	613,272	0.135	82,792	154.72	6,405	9.57	6,469
Totals	4,870,520		649,298		**51,304**		**51,557**

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.

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

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

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

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

N2O from mobile sources					
N2O	gallons consumed	g N2O/gal fuel	total kg N2O	short tons	CO2e short tons
Gasoline	1,479,436	0.22	325.48	0.366	108.92
Diesel	2,706,882	0.26	703.79	0.790	235.53
Jet Fuel	613,272	0.26	159.45	0.179	53.36
Propane	77	0.26	0.02	0.000	0.01
CNG	64	0.26	0.02	0.000	0.01
LPG	256	0.26	0.07	0.000	0.02
Ethanol	70,534	0.26	18.34	0.021	6.14
total					**403.98**

CH4 from mobile sources					
CH4	gallons consumed	g CH4 /gal fuel	total kg CH4	short tons	CO2e short tons
Gasoline	1,479,436	0.50	739.72	0.831	20.77
Diesel	2,706,882	0.58	1,569.99	1.763	44.08
Jet Fuel	613,272	0.58	355.70	0.399	9.99
Propane	77	0.58	0.04	0.000	0.00
CNG	64	0.58	0.04	0.000	0.00
LPG	256	0.58	0.15	0.000	0.00
Ethanol	70,534.10	0.58	40.91	0.046	1.15
total					**75.99**

Total N2O and CH4 CO2e	**479.97**

Total Estimated Emissions from Mobile Sources (short tons CO2e)	**52,037**

Emissions from natural gas from T&D operations

The calculation for Gas Operations below is based on as reported data from the GHG Summary Report for 2016. The Spindletop Gas Storage facility emissions are calculated using GRI emission factors (see notes below).

Gas Operations	CO2 equivalent emissions from facility subparts C-II, SS, and TT (metric tons) Subpart W, Fugitive	Total C02 equivalent emissions (short tons)
Entergy Louisiana, L.L.C. Gas Business	11,565.7	12,749.0
Entergy New Orleans, Inc. Gas Business	35,381.9	39,001.8
SUB-TOTAL		**51,750.8**

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 (Cell E x 25)**	
Fugitive Emissions from Storage Facilities	1	675.4	675.40	744.50	18,612.50	See note 3
Vented Emissions from Storage Facilities	1	217.3	217.30	239.53	5,988.30	See note 4
SUB-TOTAL					**24,600.80**	

TOTALS FROM FUGITIVE NATURAL GAS **76,352** **short tons CO2e**

GENERAL NOTES:

- Source for emissions factors by equipment type is the Gas Research Institute (GRI), which provides factors in metric units 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 determined to be de minimus compared to CH4 from this source.

SPECIFIC NOTES:

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

Direct Emissions of Escaped SF6 in Electricity T&D System ("Fugitive Emissions")

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

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

2016 Fugitive SF6 Emissions Estimate			
SF6 Emissions (short tons) (1)	**Global Warming Potential (GWP) (2)**	Total CO2 Equivalent Emissions (short tons)	Total CO2 Equivalent Emissions metric tons)
9.92	22,800	**226,226.6**	**205,229.2**

(1) Converted 19,844.44 pounds to short tons - the amount of emissions reported for CY 2016.

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 by Real Estate as of December 31, 2016, that does not change significantly between inventory years. These same data and emissions totals are used each year.

2010 Update - Facilities indicates that there is no significant change to these numbers; therefore, these numbers will continue to be carried forward each year.
2013 Update - carried historical data forward; however, updated the GWP consistent with an EPA final rule that became effective on 1/1/14.
2014 Update - removed the Thermal Operations facilities, as these were sold in late-2013.
2015 Update - No changes made
2016 Update - Values updated as of December 31, 2016

	square footage air-conditioned	EF: fugitive HFCs (short tons CO2e/sq ft) *	Facility fugitive HFC (short tons CO2e)
Entergy owned space	2,158,989	**0.00078**	1,683
Entergy capital lease space	1,708,276	**0.00078**	1,332
Generation plant space	1,700,000	**0.00078**	1,325
Total Fugitive HFCs	5,567,265		4,340

Generation plant space assumes 50,000 sq. ft. per plant; 34 plants assumed.

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	52,037	3.50%	1,821

Total CO2 from all mobile source fuels are included

Total fugitive HFC emissions **6,161** short tons CO2e

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

The calculation used in calculating the emissions factor for metric tons of CO2e fugitive HFC.	Average cooling capacity of chiller (ft2/ton of cooling capacity)	HFCs in chiller (kg HFC/tons of cooling)	Annual HFC loss factor (percent)	Total Annual HFC losses (MT HFC/1000 ft2)	Total Annual HFC losses (MT CO2e)/1000 ft2	Total Annual HFC losses (**MT CO2e**)/ ft2	Total Annual HFC losses (**short tons** CO2e)/ ft2
	280	1.2	15%	0.000642857	0.71	0.00071	**0.00078**
	Source: ASHRAE (http://www.themcdermottgroup.com/Newsworthy/HVAC%20Issues/Rule%20of%20Thumb%20Sizing.htm) Note that this is a conservative estimate - a reasonably designed building should be	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 (1,100).	Emissions factor for MT CO2e per ft2.	Emissions factor for short tons CO2e per ft2; conversion factor 1.1023

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

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=1100	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%	176	20	15,000	8.87	6,653	**2.6%**
light truck	1.2	20%	264	15	15,000	8.87	8,870	**3.0%**

Power purchased to serve utility customers

Controllable power purchases - 2017

				2017			
Code	Plant description	FACILITY CODE (SPO)	State	Total Entergy purchased from plant (MWh)	Unit/Plant-Specific Emission Factor (lbs CO2/MWh), Based on Total Output [from eGRID2016 data, released 2/15/2018 unless otherwise noted]	CO2 emissions from puchased power (short tons) [using eGRID Unit-Specific Factors (when available)]	Comments/Notes
[redacted]						523.8	
						1,109,223.0	
						420,783.9	
						84,015.1	
						-	
						833,169.7	
						1,269,062.3	
						-	
						38,243.9	
Totals				**9,077,392.1**		**3,755,021.6**	**short tons CO2**
N2O emissions from controlled purchases (SERC MS Valley Total Output Rate, eGRID2016)				0.007	lbs/MWh	**9,467.7**	**short tons CO2e**
CH4 emissions from controlled purchases (SERC MS Valley Total Output Rate, eGRID2016)				0.050	lbs/MWh	**5,673.4**	**short tons CO2e**

* - 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

TOTAL	**3,770,162.6**	**short tons CO2e**

Indirect Emissions associated with purchased power	**Totalpchsd power MWh**	**Loss factor %**	**Total power lost MWh**		
CO2 emissions from T&D losses of purchased power on Entergy system	**9,077,392**	3.478%	315,734	130,608.7	short tons CO2
CH4 emissions from T&D losses of purchased power on Entergy system				27.6	short tons CO2e
N2O emissions from T&D losses of purchased power on Entergy system				2,352.2	short tons CO2e
			TOTAL	**132,988.6**	**short tons CO2e**

Grid Power purchased for EWC plants/operations (non-Entergy power)

Plant and associated facilities[2]	2016 Electricity Usage (kwh)	eGRID Subregion	eGRID2016 Emission Factor (lb CO2e/MWh)	Estimated Emissions (short tons CO2e)
Indian Point Energy Center (IPEC)	96,050,000	NYCW	637.08	30,595.7
James A. Fitzpatrick (JAF)	15,799,000	NYUP	295.94	2,337.8
Pilgrim (PIL)	12,461,000	NEWE	563.72	3,512.2
Palisades (PAL)[1]	-	RFCM	1,278.90	0.0
TOTAL	**124,310,000**		**TOTAL**	**36,445.7 short tons CO2e**

(1) Provided by Anthony Dichman based on Station Service Purchases from ISOs. Calculations on file.
(2) Vermont Yankee entered decommission status and did not operate beginning in 2016 - according to Nuclear, their power usage is negligible; so this was removed beginning in 2016.

*** **2014 NOTE** - Due to the transition in late 2013 to MISO, Entergy is no longer quantifying emissions from "non-controllable purchases" due to the fact that there is a risk that double counting may occur.

Operating Company	Generation GWh	Purchases GWh	Total Power	Losses	% Lost
EAI	24,173	8,205	32,378	1,118	**0.034529619**
ELL	39,213	25,242	64,455	1,607	**2.493212319**
EMI	7,529	8,282	15,811	914	**5.780785529**
ENOI	1,742	5,836	7,578	47	**0.620216416**
ETI	8,621	15,986	24,607	696	**2.828440456**
SERI	10,543	-	10,543	(4)	**-0.037939865**
ELIM		(29,504)	(29,504)		
TOTALS*	**91,821**	**34,047**	**125,868**	**4,378**	**0.034782415**

***Per Kyle Sennino**

Source: 2015 Stat Rpt Pg 35

4,378,000 Total Loss
125,868,000 Total Power
0.0348 % Loss

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

Values below represent those reported in the 2016 Annual GHG Inventory Report submitted by Gas Operations and provided to ESP for each location.

Gas Operation	CO2 equivalent emissions from supplier subparts LL-QQ (metric tons) Subpart NN Product Combustion	Total CO2 equivalent emissions (short tons)
Entergy Louisiana, L.L.C. Gas Business	347,519.8	383,074.6
Entergy New Orleans, Inc. Gas Business	427,529.0	471,269.5
TOTAL	**775,048.8**	**854,344.0**

Employee Commuting Emission Calculations

Commuter Travel Calculations

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

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

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

Distribution of Commuting Method by Miles						
	Individual Drivers	**Carpoolers**	**Vanpoolers**	**Public**	**Bikers**	**Walkers**
	181	-	-	1	4	108
	1393	-	-	7	40	36
	2307	-	-	12	-	-
	2895	-	-	15	-	-
	2285	-	-	12	-	-
	3497	1154	33	19	-	-
Total	12558	1154	33	67	44	144

Method of Transportation	Miles Traveled by Method (using midpoint of mileage range)			Estimated Emissions			
	one way	**round trip**	**yearly miles**	**yearly gallons**	**lbs**	**short tons**	**met tons**
Walkers =	157	314	66811	-	-	-	
Bikers =	122	244	51890	-	-	-	
Carpoolers =	40957	81914	17447772	290796	5815924	2908	2638
Vanpoolers =	1181	2363	503301	3355	67107	34	30
Public Transporters =	1325	2650	564467	2258	45157	23	20
Individual Drivers =	24991	499981	106496040	4259842	85196832	42598	38645
Total			125130281	4556251	91125020	45563	41334

Employee Commuter Travel 2014

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

Commuting method (more than 75% of the time)	Miles travelled per year	Greenhouse gas	Total emissions kg CO2e	Total emissions short tons CO2e	Total Emissions metric tons CO2e	% total commuting emissions
Individual car	106,496,040	CO2	38,764,559	42,730	38,765	82.9%
		CH4	69,329	76	69	0.1%
		N2O	1,056,441	1,165	1,056	2.3%
Vanpool	503,301	CO2	261,213	288	261	0.6%
		CH4	380	0.42	0.38	0.0%
		N2O	7,333	8	7	0.0%
Public Transportation	564,467	CO2	77,077	85	77	0.2%
		CH4	25	0.03	0.02	0.0%
		N2O	201	0.22	0.20	0.0%
Carpool	17,447,772	CO2	6,350,989	7,001	6,351	13.6%
		CH4	11,358	12.52	11.36	0.0%
		N2O	173,082	191	173	0.4%
Bikers	51,890	CO2	-	-	-	0.0%
		CH4	-	-	-	0.0%
		N2O	-	-	-	0.0%
Walkers	66,811	CO2	-	-	-	0.0%
		CH4	-	-	-	0.0%
		N2O	-	-	-	0.0%
Total	125,130,281		46,771,988	**51,557**	**46,772**	**100.0%**

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

EPA Methodology

E=VMT*(EF_{CO2} + EF_{CH4}*0.021 + EF_{N2O}*0.310)
E= total CO2e
VMT= vehicle miles travelled per year
EF_{CO2}= CO2 emissions factor
EF_{CH4}= CH4 emissions factor
EF_{N2O}= N2O emissions factor
0.021= conversion factor
0.310= conversion factor

*used for individual car, carpool and vanpool

E=PMT*(EF_{CO2} + EF_{CH4}*0.021 + EF_{N2O}*0.310)
E= total CO2e
PMT= passenger miles travelled per year
EF_{CO2}= CO2 emissions factor
EF_{CH4}= CH4 emissions factor
EF_{N2O}= N2O emissions factor
0.021= conversion factor
0.310= conversion factor

*used for bus, air and rail travel

Method of travel	EF_{CO2} (kg Co2/vehicle-mile)	EF_{CH4} (g CH4/vehicle-mile)	EF_{N2O}(g N2O/vehicle-mile)
Individual car	0.364	0.031	0.032
Vanpool	0.519	0.036	0.047
Carpool	0.364	0.031	0.032
Bus	0.107	0.0006	0.0005
Short haul airline (domestic)	0.185	0.0104	0.0085
Medium haul airline (continental)	0.229	0.0104	0.0085
Long haul airline (intercontinental)	0.277	0.0104	0.0085
Itercity rail	0.185	0.002	0.001
Commuter rail	0.172	0.002	0.001
Transit rail	0.163	0.004	0.002

Estimating Fuel Use
Fuel use= DT x FE
DT= Distance travelled activity factor
FE= Fuel economy factor (ie. kgCO2/mile, gCH4/mile, gN2O/mile) *see emissions factors chart above

*used to detrmine the breakdown of CO2, CH4, N20 within total CO2e.

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

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

EPA Climate Leaders Emissions Factors for Fossil Fuel and Biomass Combustion

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

				CO2 Emissions -- kg			CO2 Emissions -- lbs			CH4 Emissions				N20 Emissions			
Fuel type	EPA Standard Heating Value (HHV): custom heating values should be used if	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=25	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=298	EPA emission factor (lbs **CO2e**/MMBtu)	N2O (**CO2e**) emissions (**lbs** CO2e N2O/**lb** CO2)
Liquid fossil	**MMBtu/bbl**				kg CO2/gallon	kg CO2/bbl		lbs CO2/gallon	lbs CO2/bbl								
Gasoline / petrol	5.253	19.34	0.99	70.95	8.79	369.18	156.44	19.38	814.04								
Kerosene	5.670	19.72	0.99	71.58	9.66	405.88	157.84	21.31	894.97	Note: CH4/N2O emissions factors for all mobile sources are dependent on many variables; for mobile sources consult the EPA Guidance Protocol							
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)	0.045 0.068	0.099 0.149	0.0006 0.0009	.54 (ind) .54 (elect gen)	0.16092 0.16092	0.355 0.355	0.0022 0.0022
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)	0.045 0.068	0.099 0.149	0.0006 0.0009	1.8 (ind) 2.7 (elect gen)	0.16092 0.16092	0.355 0.355	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)	0.119 0.025	0.262 0.055	0.00225 0.00047	0.095 (ind) 0.095 (elect gen)	0.028 0.030	0.062 0.066	0.0005 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)	0.250 0.025	0.551 0.055	0.00265 0.00027	1.4 (ind) 1.4 (elect gen)	0.42 0.48	0.92 1.05	0.0044 0.0051
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)	0.753	1.659	0.0081	4.01 (ind/elect gen)	1.19	2.63	0.0129
Landfill gas (50/50)	502.5 Btu/cu ft.	14.2	0.995	51.81	.0260 /cf		114.24	.05733 /cf		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	Note: CH4/N2O emissions factors for all mobile sources are dependent on many variables; for mobile sources consult the							
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)	3,412 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,c]	12 +/- 3	25
Nitrous oxide (N2O)[c]	120	298
HFC-23[c]	264	14,800
HFC-125[c]	32.6	3,500
HFC-134a[c]	14.6	1,100
HFC-143a[c]	48.3	4,470
HFC-152a[c]	1.5	124
HFC-227ea[c]	36.5	3,220
HFC-236fa[c]	209	9,810
HFC-4310mee[c]	17.1	1,640
CF4	50,000	6,500
C2F6	10,000	9,200
C4F10	2,600	7,00
C6F14	3,200	7,400
SF6[c]	3,200	22,800

Source: Unless otherwise noted by note 'c' below, IPCC's Fourth Assessment Report (2007) GWPs.

a using a 100 year time horizon

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

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

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

Color key to calculations in the Entergy GHG Inventory

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

Yellow	Specific fuel or gas calculated	This heading identifies the fuel and emissions being calculated below it.
Red	Annual activity data input	This is an input cell for company activity or usage data related to this emissions source for a given facility, source or even corporate-wide. Examples of input data are gallons of gasoline, lbs of 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

2017 GHG Inventory Verification Statement and Report

Entergy Corporation Greenhouse Gas Inventory for Calendar Year 2017

Verification Report

March 2, 2018

ICF
9300 Lee Highway
Fairfax, VA
22031

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Statement of Verification

March 2, 2018

Entergy Corporation
Environmental Strategy & Policy Group
Entergy Services, Inc.
639 Loyola Ave (L-ENT-13D)
New Orleans, LA 70113

Scope

Entergy Corporation ("Responsible Party") engaged ICF in cooperation with Cventure LLC ("Verification Team") to review Entergy Corporation's 2017 Corporate Greenhouse Gas ("GHG") Inventory, and supporting evidence including Entergy's Greenhouse Gas Inventory Management Plan and Reporting Document, March 2018 ("IMPRD"), detailing the GHG emissions and associated source documents over the period January 1, 2017 to December 31, 2017 inclusive. These components are collectively referred to as the "GHG Assertion" for the purposes of this report.

The Responsible Party is responsible for the preparation and presentation of the information within the GHG Assertion. Our responsibility is to express a conclusion as to whether anything has come to our attention to suggest that the GHG Assertion is not presented fairly in accordance with generally accepted GHG accounting standards, in particular, *The Greenhouse Gas Protocol, A Corporate Accounting and Reporting Standard, Revised Edition, World Resources Institute and World Business Council for Sustainable Resource Development, March 2004.*

Methodology

We completed our review in accordance with the ISO 14064 Part 3:2006 *Greenhouse Gases: Specification with guidance for the validation and verification of greenhouse gas* assertions. We planned and performed our work in order to provide a limited level of assurance with respect to the GHG Assertion. Our review criteria were based on *The Greenhouse Gas Protocol* and quantification methodologies referenced in Entergy's IMPRD. We reviewed the GHG Assertion and associated documentation and believe our work provides a reasonable basis for our conclusion.

Conclusion

Based on our review, nothing has come to our attention that causes us to believe that the GHG Assertion is materially misstated. The emission estimates were calculated in a consistent and transparent manner and were found to be a fair and accurate representation of Entergy Corporation's actual emissions and were free from material misstatement. ICF has verified a total of **37,410,624** metric tons of CO_2 equivalent (CO_2e) emissions for calendar year 2017.

Duncan Rotherham
Vice President, ICF
400 University Avenue, 17th Floor
Toronto, ON M5G 1S5, Canada
Email: duncan.rotherham@icf.com
Tel.: (416) 341-0389

Julie Tartt
Lead Verifier, Senior Manager, ICF
400 University Avenue, 17th Floor
Toronto, ON M5G 1S5, Canada
Email: julie.tartt@icf.com
Tel.: (416) 341-0127

1. Verification Summary

Lead Verifier:	Julie Tartt (ICF)
Associate Verifier:	Kevin Johnson (Cventure), Cassie Rosen E.I.T. (ICF)
Technical Experts:	Kevin Johnson (Cventure), Mollie Averyt (ICF)
Internal Peer Reviewer:	Mabel Fulford (ICF)
Verification Timeframe:	November 2017 to March 2018
Objective of the verification:	Limited level assurance on Entergy's 2017 Corporate GHG Inventory
Assurance being provided to:	Entergy Corporation
Standard being verified to:	ISO 14064-3:2006 Specification with guidance for the validation and verification of greenhouse gas assertions
Verification criteria employed:	The Greenhouse Gas Protocol, A Corporate Accounting and Reporting Standard, Revised Edition, World Resources Institute and World Business Council for Sustainable Resource Development, March 2004
Verification scope – Gases:	Carbon Dioxide, Methane, Nitrous Oxide, Sulfur Hexafluoride, Hydrofluorocarbons
Organization:	Entergy Corporation
Inventory Boundary:	Equity share of Entergy's corporate operations including electric power production and retail distribution operations as well as its natural gas distribution operations throughout the 2017 calendar year
Location:	U.S.A.
Reporting Year:	January 1, 2017 to December 31, 2017 (inclusive)
Verification Summary:	No material misstatements were detected in the final GHG Assertion. Limited level assurance Verification Statement issued.

Main Contact (Verifier)	Julie Tartt Senior Manager, ICF 400 University Avenue, 17th Floor, Toronto, Ontario M5G 1S5, Canada Email: julie.tartt@icf.com Tel: (416) 341-0127
Main Contact (Responsible Party)	Rick Johnson Director, Environmental Strategy & Policy Environmental Strategy & Policy Group 639 Loyola Avenue; L-ENT-6C New Orleans, Louisiana 70113 Email: rjohn15@entergy.com Tel: (504) 576-5246

2. Introduction

Entergy Corporation ("Entergy") has prepared a voluntary greenhouse gas ("GHG") inventory for its corporate operations active through the 2017 calendar year. Entergy has engaged ICF to provide a third-party verification of the GHG inventory, including Scope 1, Scope 2, and select Scope 3 emissions, ("GHG Assertion") for voluntary GHG reporting purposes for the 2017 calendar year. Cventure LLC serves as a partner to ICF in the verification exercise ("Verification Team").

The quantification of Entergy's corporate GHG emissions inventory is guided by the World Resources Institute and World Business Council for Sustainable Resource Development's *The Greenhouse Gas Protocol, A Corporate Accounting and Reporting Standard, Revised Edition, March 2004* ("the GHG Protocol"), using an equity share approach to establish the inventory boundary. The 2017 GHG inventory includes the following emissions sources (as depicted in the figure on the next page):

Scope 1**:** Stationary combustion in electric generating units and small sources at company facilities; mobile combustion in company fleet vehicles; fugitive methane from natural gas transmission and distribution ("T&D") systems; fugitive sulfur hexafluoride (SF_6) from electric power T&D systems; and fugitive hydrofluorocarbons (HFCs) from building HVAC systems and vehicle air conditioning systems.

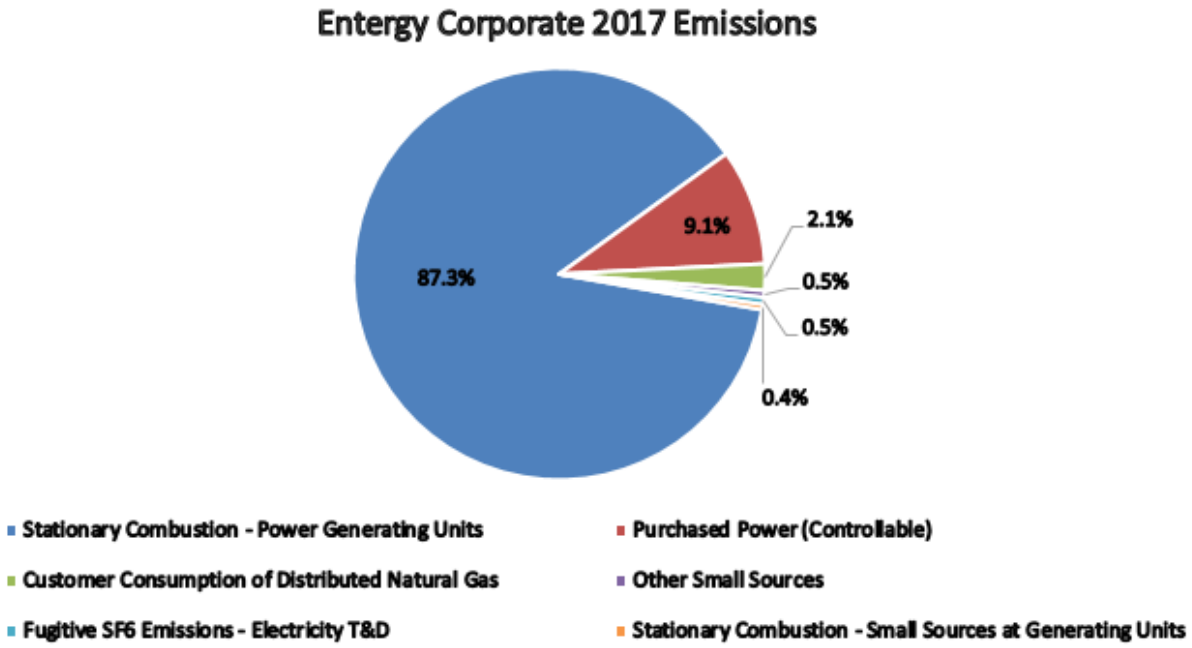
Scope 2: Indirect emissions associated with grid purchased power for wholesale generation plants (outside of Entergy's regulated electricity transmission service territory).

Scope 3: Indirect emissions associated with controllable purchased power[1] for resale to end-users; customer consumption of distributed natural gas; and Entergy employee commuting.

The GHG emissions associated with all electricity consumed in the operation of Entergy's generation facilities and in Entergy's various administrative and commercial buildings and operations, in the regulated service territory, are accounted for in the Scope 1 direct emissions from stationary combustion. In addition, emissions associated with line losses through electric power T&D systems are also captured in the Scope 1 emissions associated with stationary combustion. The GHG emissions associated with the full life cycle of the various fuel sources consumed through Entergy's business operations are not included in the inventory. In line with the 2013 through 2016 inventories and Entergy's utility generation portfolio listed on the company's website[2], emissions associated with Louisiana Station Plant 1 are also not included in the 2017 inventory, as this plant generates electricity for the sole use of ExxonMobil under a long term lease agreement.

GHG emissions from stationary combustion and controllable purchased power in aggregate comprise approximately 97% of Entergy's total 2017 corporate GHG emissions.

[1] Controllable purchased power is defined as power for which the originating source (generating plant) is known and for which Entergy has made a direct buying decision.
[2] http://entergy.com/content/operations_information/Utility_Fossil_and_Renewable_Portfolio.pdf



Other Small Sources in the figure above, comprising approximately 0.5% of the inventory, include emissions associated with: mobile combustion, purchased electricity for business operations outside Entergy service territory, fugitive CH_4 (natural gas T&D), fugitive HFCs (HVAC systems and vehicles), and employee commuting.

This is the tenth year in which ICF has been engaged by Entergy for verification services pertaining to its annual corporate inventory.

This document describes the terms and scope of this verification. It serves to communicate the findings of the verification.

3. Verification Execution

The scope of the verification was defined during the verification planning stage and is detailed in the Verification Plan, which is appended to this document. The Verification Plan also describes ICF's verification process that was executed through the course of the verification. The specific verification procedures that were planned and executed through the verification process are described in the appended Plan. The Verification Plan has evolved during the course of the verification exercise; the final version of the Plan is in the Appendix.

The 2017 GHG inventory verification focused primarily on direct emissions associated with fossil fuel consumption at large electric generating facilities using Continuous Emission Monitoring System ("CEMS") data, and indirect emissions associated with purchased power. Entergy's 2017 GHG Inventory includes several small emissions sources (small stationary combustion; fugitive emissions of SF_6 associated with electricity T&D; and customer consumption of distributed natural

gas), some of which are *de minimus*[3] in nature (mobile combustion in company fleet vehicles; employee commuting; and fugitive CH_4 associated with natural gas T&D; and HFCs from air conditioning/cooling refrigerant systems). All emissions sources in Entergy's corporate 2017 GHG inventory have been reviewed with a focus on stationary combustion from electric generating units and purchased power, given the risk-based approach used in this verification.

3.1 Site Visit/Interviews

A site visit was conducted during the period of January 22 to 24, 2018 in Arkansas and Texas. The site visit and interviews consisted of two types of meetings. One set of meetings was devoted to better understanding the operations, data gathering processes and links to data systems, management controls, and overall Entergy information systems through in-person interviews with key Entergy personnel at Entergy's offices in The Woodlands. The second included visits to Entergy's White Bluff Coal-Fired Plant and the West Markham Service Center in Arkansas and Lewis Creek Gas Plant and the Conroe Service Center in Texas, as part of our sampling exercise in an effort to obtain data from plants and to better understand GHG information and data management systems. This included a review of all GHG emissions sources at the facilities through a review of the process flow and data flow diagrams. Subsequently, a review of metering and data management processes was discussed with control room operations staff, including a review of meter calibration/validation procedures.

The site visit was an important step in planning and executing the verification. During the course of the in-person interviews as well as the plant tours, the Verification Team interviewed key site operations personnel regarding power and fossil fuel generation plants operations and environmental data management at Entergy.

Key Entergy staff interviewed in-person during the site visits, as well as the meetings in The Woodlands, included:

- Tad Chenet and Minh Nguyen, CEMS Information and Small Stationary Combustion Sources, The Woodlands
- David Bruess and Jill Siekmeier, Fuel Supply and Oil & Gas Energy Analytics, The Woodlands
- Grady Kaough, Power Trading Operations and Intra-System Billing ("ISB"), The Woodlands
- Stan Chivers, Environmental Analyst, White Bluff Coal Plant
- Tracy Johnson, Manager, Arkansas Environmental Support, White Bluff Coal Plant
- Erik Hauser, Plant Environmental Analyst, Lewis Creek Gas Plant
- Emily Swindler, Senior Environmental Analyst, Power Generation Environmental Services Group, Lewis Creek Gas Plant
- Tim Stone, State Manager for Mississippi and Texas, Lewis Creek Gas Plant

[3] Entergy describes emissions sources that have been estimated to be less than 1% of the total inventory as *de minimus* in its IMPRD

- Kim Fuller, Senior Environmental Analyst - SF_6 Quantification, West Markham Service Center
- Shawn Hill, Senior Environmental Analyst, West Markham Service Center
- Michael Schwab, Environmental Analyst III, Conroe Service Center
- Joe Cruz, Line Supervisor, Conroe Service Center
- Brian Robinson, Storekeeper, Conroe Service Center

3.2 Verification Approach

This section that follows outlines the approaches used to review the main emissions sources in the 2017 GHG inventory.

Stationary Combustion: Fossil Fuel Usage at Generating Facilities

The entire inventory of Entergy fossil generation units was reviewed at a limited depth, and a significant sample of data from select units was reviewed in greater detail. Generation units were selected for detailed audit trail reviews based primarily on relative contribution to the 2017 corporate GHG emissions inventory, e.g., using the 1% de minimus accounting methodology/reporting threshold of Entergy's GHG inventory, as unit selection screening priority. Other considerations in selecting units for detailed review included large, "sister" units at the same selected generation plant, availability of facility fuel usage validation data (for gas-fired facilities), and to account for some overlap with last year's samples (to test for any changes).

The twenty (20) generation units selected for this more detailed desktop review included the following 5 coal and 15 natural gas units:

Coal

- Independence 1
- Independence 2
- RS Nelson 6
- White Bluff 1
- White Bluff 2

Gas

- Hinds H01
- Hinds H02
- Hot Spring CT-1
- Hot Spring CT-2
- Lewis Creek 1
- Lewis Creek 2

- Little Gypsy 2
- Little Gypsy 3
- Ninemile Point 4
- Ninemile Point 5
- Ninemile Point 6A
- Ninemile Point 6B
- Sabine 3
- Sabine 4
- Sabine 5

As part of this detailed verification review of the Entergy CEMS units, site visit verification reviews were conducted at the following gas and coal-fired plants, respectively:

- Lewis Creek
- White Bluff

The following information was requested from Entergy and available data reviewed in relation to the above samples:

- Annual data on CO_2 emissions, electricity generation (MWh), heat input (total Btu), and operating time for all fifty-four (54) Entergy electric utility combustion generation units which operated in 2017, from the EPA Clean Air Markets (CAM) Air Monitoring Program Data (AMPD) database;

- EPA emissions collection and monitoring plan system (ECMPS) quarterly feedback reports for twenty (20) units;

- Annual CO_2 /flue gas flow monitors relative accuracy test audits (RATAs) for the five (5) selected coal units;

- Quarterly CO_2 CEM linearity checks for the five (5) selected coal units;

- Natural gas fuel flow meter CEMS calibration/accuracy checks or CO_2 CEMS annual RATA tests for the fifteen (15) natural gas units audited in detail, including documentation provided from the Lewis Creek plant environmental coordinator, and from Fossil Environmental for the balance of the natural gas-fired power plants reviewed in detail;

- Monthly facility-level gas burn data for all natural gas-fired electric generation facilities (from Entergy's Gas Burn Accounting database, maintained by the Natural Gas Supply and Purchasing Department);

- Daily facility-level coal delivery, coal usage, and coal burn testing analytical data for all three coal-fired electric generation facilities owned and operated by Entergy (from Entergy's Rail Car Management System database, maintained by the Coal Supply and Purchasing department);

- Hourly CO_2 CEMS data for 2017 obtained directly from the plant's CEMS Data Acquisition and Handling System (DAHS) for the units at the on-site survey visit facilities (Lewis Creek 1 and 2, and White Bluff 1 and 2); and

- Multiple days of third party coal burn independent sampling and testing data for three (3) coal-fired plants (Independence, RS Nelson and White Bluff).

The twenty (20) units above that were reviewed in greater detail represented approximately 64% of Entergy's total direct CO_2 emissions from power generation units in 2017.

Organizational boundaries were verified using information contained in Entergy's 2016 Statistical Report and Investor Guide, 2016 SEC 10-K, and Entergy's inventory list of generation assets posted on their corporate website. As described in Entergy's GHG Inventory Management Planning and Reporting Document, March 2018 (IMPRD), Entergy GHG emissions inventory boundaries are determined on an equity share basis (i.e., the percent equity share of those facilities owned by Entergy) which was used to calculate the GHG emissions in the inventory database for this category. These equity share values in the GHG inventory were cross-checked against the data provided in the IMPRD, Entergy's statistical reports and Entergy's asset management group.

CEMS reports supplied by Entergy were checked against both the GHG emissions data in their GHG inventory spreadsheets, and the EPA Clean Air Markets' air monitoring program data (AMPD) database, for the twenty (20) above selected units. Monthly and annual CO_2 CEMS reports were generated by the Verification Team from queries of the AMPD database, and were checked and confirmed against the data for those twenty (20) sampled units as reported in Entergy's GHG emissions inventory spreadsheets.

Associated CEM system and natural gas flow meter QA/QC supporting documentation (including relative accuracy test audits, linearity checks, and flow meter calibration tests) were reviewed for the Entergy generating units. These documentary evidence verification checks were performed and confirmed that the reported GHG emissions data, and CO_2 emissions/flue gas flow and natural gas flow monitoring measurements and monitoring calibrations, were accurate, and the associated measurements data were reliable, as reported in the Entergy GHG inventory.

For each of the units sampled, various error checking tests were performed on the Entergy GHG inventory spreadsheets, and the sampled data to assess the information collected, including some examples such as record counts/missing data, re-computation, and other cross-checks. For each of the selected units, some aggregation calculation checks, and source type and equity share checks, were made and compared against database outputs/reports and the Entergy GHG inventory spreadsheets. Also, a sampling of daily CO_2 emissions values were checked using an alternative quantification methodology, based on third-party process monitoring measurements and emission factors.

Through the course of the verification program, the data management systems and controls employed in the quantification of emissions were reviewed, as detailed in the Sampling Plan

procedures, included in Section 7 of the final Verification Plan. These systems were found to be effective in the calculation of the GHG Assertion.

Purchased Power (Controllable)

The key emissions factors, sources, and calculations that Entergy used to quantify the emissions associated with its controllable power purchases in the 2017 GHG inventory were checked. This source comprised approximately 9.1% of the total Entergy 2017 GHG Assertion.

Raw data outlining daily (and monthly) purchased power by Entergy operating company and counterparty/long-term contract for 2017 was provided by the ISB group and cross-checked against the TRADES database containing controllable purchased power for 2017, as well as the Entergy GHG inventory spreadsheets.

All controllable power purchases were checked against SPO's raw data for correct MWh amounts. They were also checked for correct application of plant-specific emissions factors from EPA's eGRID database (2018 release for year 2016 data).

Other Emissions Sources

Entergy has a number of small sources that collectively comprise approximately 3.6% of the total GHG Assertion. These sources include emissions associated with small stationary combustion sources; mobile combustion (corporate fleet); fugitive CH_4 (natural gas T&D); fugitive SF_6 (electricity T&D); fugitive HFCs (HVAC and vehicle); purchased electricity for business operations outside Entergy service territory; customer consumption of distributed natural gas; and employee commuting. Many of those emissions sources are categorized in the *de minimus*, category as defined in the IMPRD (sources representing <1% of the total GHG Assertion). Each of these emissions sources, with size relative to total GHG Assertion, was reviewed through this verification as indicated below.

Scope 1 Emissions Sources:

- small stationary combustion sources – 2016 Subpart C submissions reviewed, fuel volumes could not be confirmed (0.4% of GHG Assertion, *de minimus*)
- mobile combustion, corporate fleet – 2017 fuel consumption data was used to quantify emissions (0.1% of GHG Assertion, *de minimus*)
- fugitive CH_4, natural gas T&D – 2016 Subpart W submissions reviewed as well as Entergy estimate for Spindletop Storage Facility (0.2% of GHG Assertion, *de minimus*)
- fugitive SF_6, electricity T&D – estimate based on 2016 Subpart DD submission (0.5% of GHG Assertion, *de minimus*)
- fugitive HFCs, HVAC and vehicle – quantified from 2016 data, not revised for the 2017 inventory (0.01% of GHG Assertion, *de minimus*)

Scope 2 Emissions Source:

- purchased electricity for business operations outside Entergy service territory – quantified using 2016 data (not revised for 2017 inventory) with updated eGRID 2016 emission factors, published in 2018 (0.1% of GHG Assertion, *de minimus*)

Scope 3 Emissions Sources:

- customer consumption of distributed natural gas – 2016 Subpart NN submissions reviewed (2.1% of GHG Assertion)
- employee commuting– estimates quantified for previous years reviewed (0.1% of GHG Assertion, *de minimus*)

4. Data Management and Control System Review

A critical element of the verification process was for the Verification Team to gain a thorough understanding of the data management systems and controls employed by Entergy. This understanding necessitated a review of:

- The parties involved and their respective responsibilities;
- The facility data collection and automated data measurement and management systems;
- Software system configuration;
- Post-collection data manipulation;
- Quality assurance procedures employed to detect erroneous or missing data;
- Processes for updating historical data in the event that errors are detected;
- Document control and security systems, including access, and tracking of edits; and
- Changes to the data management system over time or opportunities for improvement.

Testing Internal Controls

The Verification Team developed a sufficient understanding of the GHG information system and internal controls to determine whether the overall data management system is sound, examining it for sources of potential errors, omissions, and misrepresentations. This assessment incorporated examining three aspects of the company's internal controls: (1) the control environment, (2) the data systems, and (3) the control and maintenance procedures. The testing procedures documented in the Verification Plan included some procedures to test the effectiveness of the internal controls in place. The results of these tests influence the type and amount of activity data being sampled. Sampling procedures are included in Section 7 of the final Verification Plan.

Conducting Substantive Testing

Substantive testing procedures were used to assess the reasonability and validity of the GHG Assertion where further testing was required to assess internal controls based on the observations and preliminary findings of the Verification Team. The specific procedures are summarized in Section 7 of the final Verification Plan as separate tables for each process or activity involved in the quantification and reporting of the GHG Assertion. Materiality was assessed for each specific

procedure and aggregate materiality was determined separately. The details of the testing of internal controls and substantive testing undertaken are described in detail in the final Verification Plan.

The Verification Team developed a thorough knowledge of the data management and control systems utilized in the organization through the review of the IMPRD, observations during the site visit, and interviews with key personnel. The following were the key data systems observed.

- CEMS data – for large fossil generating stations (as well as for small stationary sources that have CEMS).
- Gas purchases data – monthly for all gas-fired electric generating units – from David Bruess: purchase amounts inputted into ISB.
- Coal purchases data – from Rachel Hill: purchase amounts inputted into ISB.
- TRADES – controllable power purchases tracking system: hourly purchase amounts from 1/1/2017 to 12/31/2017 inclusive were extracted and sent via Excel to the Verification Team by Grady Kaough.

5. Verification Results

5.1 Discrepancies

The table below details discrepancies found during the verification process for each procedure, a discrepancy title (brief description) and final status.

Procedure	Discrepancy Title	Final Status
B1: Organization Boundaries, Infrastructure and Activities	N/A	No discrepancies detected
B2: Review of Operating Conditions	N/A	No discrepancies detected
C1: True-Up and Re-Performance Calculations	N/A	No discrepancies detected
C2: Minor/*De Minimus* Emissions - Methodology and Documentation	N/A	No discrepancies detected
D1: Data Collection and Quality Controls	N/A	No discrepancies detected
D2: Data Confirmation against External Sources	N/A	No discrepancies detected
D3: Data Migration into Inventory	N/A	No discrepancies detected

A1: Final Verification Assessment	N/A	No discrepancies detected

5.2 Aggregate Materiality

The sum of the immaterial discrepancies in the GHG Assertion does not result in a breach of materiality (greater than 10% of the total GHG Assertion). This is in line with the uncertainty assessment of Entergy's inventory.

5.3 Other Findings

- As part of the verification review of Entergy's draft stationary combustion CEMS emissions data spreadsheet, during the 2017 annual, unit-specific CO_2 emissions data cross checks with the EPA AMPD database query results, several minor, immaterial discrepancies were identified in that part of the verification review process, and were corrected by Entergy at that time.

- For the twenty (20) units identified as targets for more detailed audit sampling, air monitoring program data (AMPD), monthly/annual CO_2 CEMS data from US EPA's Clean Air Markets database system were reviewed. These results were verified against the direct emissions reported in Entergy's GHG emissions inventory spreadsheets. No material discrepancies associated with Entergy's GHG emissions inventory accounting and reporting were identified as part of this EPA CO_2 emissions database and Entergy GHG emissions inventory spreadsheets cross checks.

- Emission factors for CH_4 and N_2O emissions from each of the Entergy fossil generation units were also checked, revealing no discrepancies or omissions.

- Organizational and operational boundary, and equity share, verification checks revealed no discrepancies or omissions.

- For the three (3) Entergy-operated coal-fired electric generation plants, comparisons were made by cross-checking the daily total plant coal burn analytical data on total coal fuel heat input MMBtu, as provided by Entergy's Rail Car Management System's (RCMS) plant-level data, against the daily plant total fuel heat input from the EPA AMPD database, for all of 2017. These plant level RCMS data are based on coal feed rate process monitoring data generated by the coal feeders (which feed coal from the boiler's coal feed hoppers to the pulverizers), and coal analytical data generated by chemical analyses of coal samples taken on a daily basis by the Entergy plant personnel. The EPA data on MMBtu fuel heat input are based on in-stack CEMS measurements on flue gas flow rates, and flue gas constituent concentrations (CO_2 or O_2). The results of these cross-checking comparisons between the two, 2017 annual datasets of daily burn data showed the three plants having an average deviation of -1.0%, between the RCMS and AMPD plant heat

input daily data for 2017. The results of this cross check provides an additional degree of confidence in the reliability of Entergy's coal-fired generation GHG emissions inventory reporting, especially when considering the overall accuracy and operational/maintenance characteristics of the coal feed rate measurement process monitoring sensors, and the associated compliance monitoring-based, direct measurement CEMS system data used in this verification check.

- For the six (6) natural gas-fired facilities with generation units audit-sampled under this verification program, augmented by an additional two (2) gas plants to increase the sample size, monthly and annual natural gas fuel use/total heat input data were obtained from the Entergy Gas Burn Accounting database. This Entergy gas burn database tracks gas utility purchases and pipeline deliveries to Entergy's electric generating stations, based on the gas utility's invoice/billing data, with the associated gas volume/heat content of the amounts delivered being determined by the gas utility pipeline's natural gas flow meter (i.e., a financial meter, operated and maintained by the natural gas utility, outside the Entergy plants' fence lines). These monthly natural gas delivery/burn data from Entergy's gas burn database were then compared to the EPA AMPD database results. The results of these cross-check comparisons showed the facility-wide deviations between the two datasets had an overall average of +4.3% difference for the eight (8) facilities. Additionally, Entergy's small, natural gas-fired combustion sources' fuel use is captured in the Gas Burn database data, but not so in the EPA AMPD CEMS units' database.

- For the units with hourly data supplied by the Entergy site visit plants' personnel (at Lewis Creek and White Bluff), from the respective plant's on-site DAHS computer database archive systems, these hourly, "raw" data sets (i.e., those not yet QC'd initially by Entergy Fossil Environmental, and subsequently validated/revised/approved by EPA), were compared to the final EPA-approved AMPD database 2017 annual data. The Lewis Creek data agreed to within <0.1% for each of the two (4) units, while the White Bluff units agreed to within +/-0.7% and +/-2.4%, respectively (with the higher QC adjustments at White Bluff not being unusual, given the much harsher CEMS environment at a coal-fired plant, as compared to a gas-fired plant). Such low QA/QC adjustments of raw data throughout the 2017 reporting year is a further indicator of the overall reliability of Entergy's reported CEMS data.

- A re-calculation of CO_2 emissions based on an alternative methodology was made for each of the data-sampled coal-fired generating plants: Independence, RS Nelson, and White Bluff. Daily, third-party test burn measurements data (including coal feed rates and fuel composition analyses) provided an alternative, direct measurement of fuel heat input. This alternative quantification methodology exhibited an average daily CO_2 emissions deviation, over a range of sixteen (16) to twenty-eight (28) days of coal burn tests conducted at each plant in 2017, of 0.8% in plant-wide CO_2 emissions, as compared to the CEMS totals for the plants during the coal test burn periods. This degree of agreement

between two alternative emissions quantification methodologies is deemed to represent an acceptable precision level for alternative quantification methodologies, for an ISO 14064 limited level of assurance verification program. This is further corroborated considering that compliance-based CEMS measurements are generally significantly more accurate than most emission factor-based quantification approaches (especially compared to the use of default emission factors, as opposed to site-specific factors, as well as the accuracy level of solid fuel flow rate process monitoring measurements). Therefore, the alternative quantification methodology comparison results provide additional verification confirmation of the CEM systems measurement approach and results.

Through the course of the verification, the data management systems and controls employed in the quantification of emissions for Entergy were reviewed, as detailed in the Verification Plan procedures. These systems were found to be effective in the calculation of the GHG Assertion.

6. Verification Team

Since 1969, ICF has been serving major corporations, all levels of government, and multilateral institutions. Globally, approximately 500 of our approximately 5,000 employees are dedicated climate change specialists, with experience advising public and private-sector clients. ICF has earned a reputation in the field of climate change consulting for its analytical rigor, in-depth expertise, and technical integrity through scores of GHG emissions-related assignments over the past two decades.

For more than a decade, ICF has carried out numerous facility-level GHG verifications and verifications of emissions reduction projects. ICF's Verification Body has developed the necessary internal controls to ensure qualified and competent staffing uphold the principles of the relevant standard while quality control processes are utilized to assure data integrity is maintained and safeguarded. ICF's clients choose ICF for its strong brand, technical expertise, and rigorous methodological approach. ICF has assembled a Verification Team consisting of experienced GHG verifiers and relevant technical experts.

Verifiers

Julie Tartt has a Bachelor of Science degree in Environmental Sciences from the University of Guelph and has completed supplementary verification training, receiving a certificate of training for ISO 14064. Julie is the Manager of ICF's Verification Management System (VMS) and is also a Lead Verifier – she led and managed the development of ICF's ANSI-accredited ISO 14065 VMS. *Note that while ICF no longer maintains the ISO 14065 accreditation, it still maintains its Verification Body*. Julie has considerable experience and expertise quantifying greenhouse gases through her work developing numerous GHG inventories, and verifying GHG emissions. Julie has been working with ICF's Verification Body since 2010 and has worked on verifications under several regulatory reporting programs including British Columbia, Ontario, and Quebec's Greenhouse Gas Reporting Regulations, and Alberta's Specified Gas Emitters Regulation. Facility compliance reports verified have included natural gas pipeline and natural gas processing linear facility operations, coal mining,

electricity generation, and cogeneration facilities. Emissions reduction project verifications have included wind electricity generation, landfill gas capture and utilization, aerobic composting, and tillage management projects. Additionally, she has provided verification services for organizations reporting to the Carbon Disclosure Project and The Climate Registry, as well as voluntary emissions reductions projects. Julie also has extensive experience managing and administering large, multi-client, carbon market modeling and analysis studies nationally and at the provincial level.

Kevin Johnson (Cventure LLC) has over 30 years energy and environmental consulting experience, focusing over the last half of his career on verification, greenhouse gas and CO_2 emissions inventories, carbon offset projects, and sustainability programs. In 2005, he founded Carbon Solutions, Inc., an independent consulting services firm, and in 2007 co-founded Cventure LLC. While a contractor for ERT-Winrock in 2008-9, he served as project manager for several GHG emissions reduction credit ("ERC") protocol development and verification projects, as well as corporate GHG inventory verification projects, and drafted the verification guidelines for the American Carbon Registry. He was also a primary author of the ERT Corporate GHG Verification Guidelines, and has performed dozens of verification projects for over a decade. At Cventure, he has also performed CDP reporting benchmarking, and ISO 14064 and GRI sustainability reporting gap analyses, for several commercial clients. Prior to forming Carbon Solutions, Inc., he previously served as the leader of URS Corporation's corporate GHG/climate change practice. Some of his other project management experience includes corporate strategy development, offset project assessments and feasibility studies, GHG emission inventories/protocols and verification, environmental management information system implementations, and ERC verification and trading support. Some climate change clients include Entergy, Exelon, Eni, El Paso, Google, Wal-Mart, Bloomberg LP, NewsCorp, Marathon, 21st Century Fox, Unocal, T. Rowe Price, Conoco, Compuware, PetroSource, Kimco Realty, BlueSource, Anadarko Petroleum, Albertsons, US Energy Biogas, EDF, U.S. DOE, GRI, U.S. EPA, and several independent oil producers.

Cassie Rosen is an Analyst in ICF's Toronto office. Cassie has a Bachelor of Applied Science in Engineering Science with a specialization in Energy Systems from the University of Toronto (2015) and has a Master of Science in Technology and Policy from the Massachusetts Institute of Technology (2017). Cassie has taken courses on climate science and risk assessments. Her GHG verification experience includes waste heat recovery and energy efficiency offset projects for industrial clients. Cassie has previous experience working as a technical expert for federal (US EPA and US FAA) and international (ICAO) task groups analyzing the lifecycle GHG emissions of conventional and alternative transportation fuels.

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Kevin Johnson, while at Radian Corporation during the first half of his career, had significant field experience with continuous emissions monitoring systems ("CEMS"). These field testing projects included serving as project manager or on-site field testing task leader on CEMS testing projects at four electric power generation plants, numerous industrial steam plant boilers, and a cement kiln; two of those electric utility field testing projects also included CEMS certification relative accuracy test audit ("RATA") testing.

Mollie Averyt is a Senior Manager with ICF with over 15 years of professional experience predominantly providing technical and analytical support for environmental policy analyses related to climate change and ozone depletion issues. Her climate change expertise covers the non-CO_2 greenhouse gases, particularly in the electric power systems, chlorodifluoromethane (HCFC-22) production, solvents, and aerosols, emission source categories. Ms. Averyt is providing ongoing support to EPA's Climate Change Division for the fluorinated GHG source categories under EPA's Greenhouse Gas Reporting Program. Ms. Averyt also serves key roles in the development of marginal abatement curve analyses that forecast high GWP gas emissions and assess the costs of potential options to mitigate such emissions. Ms. Averyt has provided technical and program support for EPA's SF_6 Emission Reduction Partnership for Electric Power Systems since 2002. She recently co-authored two papers on fluorinated GHG emissions—one on trends in the United States and the other on a comparison of estimates of U.S. SF_6 consumption. Ms. Averyt has also provided policy and implementation support for other clients including the European Commission, the Center for Environmental Cooperation, and the Regional Greenhouse Gas Initiative. She holds a Master's degree in Environmental Science and Policy from Johns Hopkins and a Bachelors of Science degree in Environmental Science from the University of Vermont.

Internal Peer Reviewer

Mabel Fulford is a Senior Associate in ICF's Commercial Energy division, and has a strong academic background in global energy systems, combining technical, economic and policy subjects. Mabel has been a member of ICF's Verification Body since 2013 and has acted as Lead Verifier, Associate Verifier, or Peer Reviewer on over 30 verifications for a variety of facilities. Mabel's verification experience includes both voluntary and compliance GHG emissions verifications across British Columbia, Alberta, Ontario, Quebec, Brazil, and international reporting to The Climate Registry. All verifications are conducted to ISO 14064 standards. Mabel has considerable experience quantifying greenhouse gases (GHGs) through her work developing GHG inventories and has expertise in ICF's proprietary GHG:ID quantification tool. Mabel's work at ICF also includes climate policy and carbon markets advisory services. She is also skilled in regional energy modeling, and holds an NRCan certificate in Advanced Building Recommissioning (RCx). Mabel holds a BEng in Chemical Engineering from McGill University, a MSc in Sustainable Energy Futures from Imperial College London and a MASc in Chemical Engineering from the University of Toronto, and has a supplementary certificate in ISO 14064 GHG Verification. Mabel is bilingual (English/French).

Conflict of Interest

ICF and the Verification Team has conducted a review of any real or perceived conflicts of interest resulting from advocacy, intimidation, self-review, self-interest or familiarity. No threats to independence, either real or perceived, have been identified.

Statement of Qualifications

The information contained within this document and this statement of qualifications is complete and correctly represents the qualifications of ICF and the members of the Verification Team described herein. Dated this second day of March, 2018.

Duncan Rotherham
Vice President, ICF
400 University Avenue, 17th Floor
Toronto, ON M5G 1S5, Canada
Email: duncan.rotherham@icf.com
Tel.: (416) 341-0389

Appendix

Verification Plan

2017 Verification Plan

Entergy Corporation

1 Introduction

This document provides details on the verification scope and process that is planned to conduct a limited level verification of the 2017 organization-wide GHG inventory ("GHG Assertion") for Entergy Corporation ("Entergy"). The GHG Assertion made by Entergy requires the quantification of the emissions produced during calendar year 2017, and related primarily to stationary combustion of fossil fuels and from purchased power, as well as from a number of minor sources. An overview of operations for the organization will be provided in the Verification Report.

A Verification Risk Assessment will be conducted during the verification planning stage; the results of which will be provided in Section 6 of this final Verification Plan. Additionally, the results of the Risk Assessment informed the development of the Sampling Plan.

The Verification and Sampling Plans will be updated through the course of the verification as additional information becomes available.

The verification conclusion will be documented in the Verification Statement and the verification findings will be further described in the Verification Report. The Verification and Sampling Plans will be appended to the Verification Report to provide information related to the verification scope and process.

2 Verification Scope

2.1 Objective

The primary objective of this verification engagement is to provide assurance to Entergy, and any external users of Entergy's public GHG reporting, that the GHG Assertion is reliable, and of sufficient quality for:

- Internal purposes, namely tracking towards internal reduction targets as well as annual reports, corporate social responsibility ("CSR") reports, and other disclosures;
- External voluntary reporting, primarily to the Carbon Disclosure Project ("CDP") the Dow Jones Sustainability Index ("DJSI"), and the American Carbon Registry ("ACR").

2.2 Parties and Users

The person or persons responsible for the provision of the GHG Assertion and the supporting information, as defined in Section 2.23 of ISO 14064-1:2006, is the "Responsible Party". For this verification, Entergy is the Responsible Party.

ICF has been engaged to provide a third-party verification of the GHG Assertion. Experts from ICF as well as from Cventure LLC compose the "Verification Team".

The "Intended User," is defined in Section 2.24 of ISO 14064-1:2006 as the individual or organization identified by those reporting GHG-related information that relies on that information to make decisions. Entergy (and the public at large) are the intended users of the information contained within the Verification Statement.

2.3 Scope

The verification will be conducted in accordance with *ISO 14064-3: Specification with guidance for the validation and verification of greenhouse gas assertions.* The verification will be designed to provide a *limited level of assurance.*

The Verification and Sampling Plans were developed based on the relevant criteria described in the following:

- The Greenhouse Gas Protocol – A Corporate Accounting and Reporting Standard (WRI/WBCSD Revised Edition, 2004)

The following table defines the scope elements specified for the organization.

Scope Element	ISO 14064-1 Definition
Boundary	The organization's corporate-wide boundary, including legal, financial, operational and geographic boundaries
Infrastructure and Activities	The physical infrastructure, activities, technologies and processes of the organization
GHG Sources	GHG sources to be included
GHG Types	Types of GHGs to be included
Reporting Period	Time period to be covered

The manner in which each of the above scope elements applies to Entergy's GHG Assertion are described below.

Boundary

During the initial verification planning, the organizational boundaries and the sources which would be required to be included in the emissions inventory quantification will be reviewed. The procedures to review the GHG Assertion will be designed to support a *limited level* of assurance. These procedures will systematically review:

- the emissions sources included in the quantification procedures;
- the methodologies employed in the quantification procedures;
- data handling, information and management system and associated controls, and quality assurance / quality control activities;
- any changes in the quantification methodology, or to organizational boundaries due to acquisitions or divestitures, as compared to previous corporate GHG emissions reports;
- the GHG Assertion.

Entergy has chosen to include all company-owned assets and those under a capital lease consistent with *'equity share'* reporting under EPA and WRI/WBCSD GHG reporting protocols.

Infrastructure and Activities

According to Entergy's website[1], "Entergy Corporation 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, including nearly 9,000 megawatts of nuclear power. Entergy delivers electricity to 2.9 million utility customers in Arkansas, Louisiana, Mississippi and Texas. Entergy has annual revenues of approximately $10.8 billion and nearly 13,000 employees."

GHG Sources

The following key sources comprise the 2017 GHG inventory categorized by Entergy as follows:

Entergy Category	Emissions Source Category	Corporate Emissions Source	GHGs Included
Direct Emissions	Stationary Combustion	Power Generating Units	CO_2 , CH_4 , N_2O
		Small Stationary Combustion	CO_2 , CH_4 , N_2O
	Mobile Combustion	Corporate Fleet	CO_2 , CH_4 , N_2O
	Fugitive Emissions	Natural Gas Trans. & Dist.	CH_4
		Electricity Trans. & Dist.	SF_6

[1] Accessed on January 15, 2018 at http://entergy.com/about_entergy/

Entergy Category	Emissions Source Category	Corporate Emissions Source	GHGs Included
		Cooling/Air-Conditioning (building, mobile sources)	HFCs
Indirect Emissions	Purchased Electricity	Purchased Power for Business Operations Outside Entergy Service Territory	CO_2, CH_4, N_2O
	T&D Losses	Entergy Purchased Power Consumed on Entergy T&D System	CO_2, CH_4, N_2O
Optional Emissions Sources	Purchased Power (Controllable)	Controllable Purchased Power Sold to Customers	CO_2, CH_4, N_2O
	Product Combustion	Combustion of Natural Gas Distributed to Customers	CO_2, CH_4, N_2O
	Employee Commuting		CO_2, CH_4, N_2O

GHG Types

The emission portion of the assertion accounts for the following greenhouse gases:

- Carbon Dioxide (CO_2)
- Methane (CH_4)
- Nitrous Oxide (N_2O)
- Hydrofluorocarbons (HFCs)
- Sulphur Hexafluoride (SF_6)

Neither Perfluorocarbons nor Nitrogen Trifluoride are not included in Entergy's inventory given the nature of its business and that these classes of chemicals are not used in any of Entergy's operations in any sizeable amount.

The final inventory will be expressed in both short tons of CO_2 equivalent emissions ("CO_2e"), as well as in metric tonnes CO_2e.

Reporting Period

The GHG Assertion covers the 2017 calendar year, from 1 January 2017 through 31 December 2017, inclusive.

2.4 Materiality

During the course of the verification, individual errors, omissions or misrepresentations (collectively referred to as discrepancies) or the aggregate of these discrepancies will be evaluated qualitatively and quantitatively.

Materiality defines the level at which discrepancies in the GHG Assertion or any underlying supporting information precludes the issuance of a limited level of assurance.

The Verification Team is responsible for applying professional judgment to determine if *qualitative* discrepancies could adversely affect the GHG Assertion, and subsequently influence the decisions of the Intended User, in which case, the discrepancies are deemed to be material.

Quantitative discrepancies will be calculated individually to determine the impact of the discrepancy as a percentage of the GHG Assertion.

All discrepancies that are outstanding at the conclusion of the verification will be documented in the Verification Report and classified on an individual basis as either material or immaterial.

Materiality Threshold

In the framework of a corporate entity-wide GHG inventory, the concept of materiality is defined in the context of the overall uncertainty in the reported data. A quantity, in this case errors and/or uncertainties associated with reported results, is typically considered to be "material" if it would influence any decision or action taken by users of the information. This definition of materiality is consistent with verification guidelines and goals for the reliability of reported data.

Materiality is not the same as a *de minimus* emissions threshold for either the exclusion of specific sources from the inventory, or the use of estimated values without ongoing, annual collection of associated activity data. While a *de minimus* exclusion from the inventory would contribute to overall uncertainty, completeness is only one component contributing to overall uncertainty.

A materiality threshold for this limited level of assurance verification was set at 10% for the corporate inventory.

Individual discrepancies and the aggregate of individual discrepancies will be analyzed to determine if the materiality threshold has been breached.

Entergy's current GHG inventory management plan and reporting document ("IMPRD") states that *"...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*." The *de minimus* label for emissions sources <1% of the total inventory was selected by Entergy to delineate a threshold for inventory quantification. Sources that fall within the *de minimus* category can re-use an emissions estimate for up to five years before having to re-calculate the emissions. Note that *de minimus* sources (as defined by Entergy) are still included in the total inventory quantification, they are just not re-calculated every year.

2.5 Principles

ISO 14064 defines five principles that should be upheld in the development of the GHG Assertion. These principles are intended to ensure a fair representation and a credible and balanced account of GHG-related information. The verification procedures developed and executed during the course of this verification will present evidence such that each of these principles is satisfied.

Relevance

Appropriate data sources are used to quantify, monitor, or estimate GHG sources. Appropriate minimum thresholds associated with emissions levels, i.e., from *de minimus* sources, are used to justify the exclusion or the aggregation of minor GHG sources or the number and/or frequency of data points monitored.

Completeness

All sources within Entergy's GHG inventory boundary are included within an identified source category.

Consistency

Uniform calculations are employed between the base year (i.e., year 2000 emissions, for establishing Entergy's baseline emissions levels from which past, and current, GHG emissions reduction target commitments have been made), and current accounting/reporting periods (e.g., years 2010-2020, 3rd period reduction target commitments, also defined in terms of a year 2000 baseline). Emissions calculations for each source are calculated uniformly. If more accurate procedures and methodologies become available, documentation should be provided to justify the changes and show that all other principles are upheld.

Accuracy

Measurements and estimates are presented, without bias as far as is practical. Where sufficient accuracy is not possible or practical, measurements and estimates should be used while maintaining the principle of conservativeness.

Transparency

Information is presented in an open, clear, factual, neutral, and coherent matter that facilitates independent review. All assumptions are stated clearly and explicitly and all calculation methodologies and background material are clearly referenced.

2.6 Limitation of Liability

Due to the complex nature of the organization's operations and the inherent limitations of the verification procedures employed, it is possible that fraud, error, or non-compliance with laws, regulations, and relevant criteria may occur and not be detected.

3 Verification Team

Since 1969, ICF has been serving major corporations, all levels of government, and multilateral institutions. Globally, approximately 500 of our approximately 5,000 employees are dedicated climate change specialists, with experience advising public and private-sector clients. ICF has earned an international reputation in the field of climate change consulting for its analytical rigor, in-depth expertise, and technical integrity through scores of GHG emissions-related assignments over the past two and a half decades.

ICF has carried out hundreds of facility-level GHG verifications and verifications of emission reduction projects. ICF has developed the necessary internal controls to ensure qualified and competent staffing uphold the principles of the relevant standard while quality control processes are utilized to assure data integrity is maintained and safeguarded.

For this verification, ICF assembled a Verification Team consisting of experienced GHG verifiers and relevant technical experts. The roles of the Verification Team and Internal Peer Reviewer are provided below, followed by relevant bios.

Lead Verifier

The Lead Verifier is responsible for overseeing all activities conducted within the verification, including overseeing the development of the Verification and Sampling Plans and the execution of the verification procedures. The Lead executes the Verification Statement at the conclusion of the engagement.

Verifiers

The Verifiers work with the Lead Verifier to conduct the verification procedures.

Technical Experts

The Verification Team is supported by Technical Experts, who review the Verification Risk Assessment and provide advice on the development of the Verification and Sampling Plans to ensure risks are addressed with rigorously designed verification procedures. The Technical Experts are also available to the Verification Team through the course of the verification to provide assistance with any issues as they arise.

Internal Peer Reviewer[2]

The Internal Peer Reviewer is not a member of the Verification Team and does not participate in the verification until the draft Verification Report and draft Verification Statement have been prepared. The Internal Peer Reviewer conducts an internal assessment of the verification to ensure the verification procedures have been completed, the results of the verification have been thoroughly documented, any issues or discrepancies have been investigated and the verification evidence is sufficient to reach the verification conclusion described in the Verification Statement.

[2] Note: the Internal Peer Reviewer is not a member of the Verification Team, but is listed here to keep the list of personnel involved in the engagement in one place.

Verifiers

Julie Tartt has a Bachelor of Science degree in Environmental Sciences from the University of Guelph (Ontario, Canada) and has completed supplementary verification training, receiving a certificate of training for ISO 14064. Julie is the Lead Verifier for this engagement. Julie is the Manager of ICF's Verification Management System (VMS) and is also a Lead Verifier – she led and managed the development of ICF's ANSI-accredited ISO 14065 VMS. *Note that while ICF no longer maintains the ISO 14065 accreditation, it still maintains its Verification Body*. Julie has considerable experience and expertise quantifying greenhouse gases through her work developing numerous GHG inventories, and verifying GHG emissions. Julie has been working with ICF's Verification Body since 2010 and has worked on verifications under several regulatory and voluntary reporting programs including British Columbia, Ontario, and Quebec's Greenhouse Gas Reporting Regulations, and Alberta's Specified Gas Emitters Regulation. Facility compliance reports verified have included natural gas pipeline and natural gas processing linear facility operations, coal mining, electricity generation, and cogeneration facilities. Emissions reduction project verifications have included wind electricity generation, landfill gas capture and utilization, aerobic composting, and tillage management projects. Additionally, she has provided verification services for organizations reporting to the Carbon Disclosure Project and The Climate Registry, as well as voluntary emissions reductions projects. Julie also has extensive experience managing and administering large, multi-client, carbon market modeling and analysis studies nationally and at the provincial level.

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Cassie Rosen is an Analyst in ICF's Toronto office. Cassie has a Bachelor of Applied Science in Engineering Science with a specialization in Energy Systems from the University of Toronto (2015) and has a Master of Science in Technology and Policy from the Massachusetts Institute of

Technology (2017). Cassie has taken courses on climate science and risk assessments. Her GHG verification experience includes waste heat recovery and energy efficiency offset projects for industrial clients. Cassie has previous experience working as a technical expert for federal (US EPA and US FAA) and international (ICAO) task groups analyzing the lifecycle GHG emissions of conventional and alternative transportation fuels.

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Futures from Imperial College London and a MASc in Chemical Engineering from the University of Toronto, and has a supplementary certificate in ISO 14064 GHG Verification. Mabel is bilingual (English/French).

4 Verification Process

The ICF approach for conducting verification of a GHG Assertion follows the tasks outlined in the following diagram. Although these tasks are generally completed sequentially, the order may be modified according to circumstances such as scheduling and data availability.

Pre-Engagement	Approach	Execution of Verification	Completion
1. Selection of Lead Verifier	6. Selection of Verification Team	12. Site Visit	17. Evaluate Evidence
2. Initiate Conflict of Interest Procedure	7. Communication with Client/Responsible Party	13. Conduct Verification Procedures	18. Hold Verification Findings Meeting (if necessary)
3. Pre-Engagement Planning	8. Kick-off Meeting	14. Issue Clarification & Data Request	19. Draft Verification Report & Statement
4. Contract Execution	9. Assess GHG Program & Revise Procedures as Required	15. Revise & Finalize Verification and Sampling Plan	20. Internal Peer Review
5. Initiate Verification Tracking	10. Draft Verification and Sampling Plan	16. Address and Evaluate Outstanding Issues	21. Issue Verification Report & Statement
	11. Verification Risk Assessment		22. Close Verification File
			23. Develop and Issue Management Memo

4.1 Pre-Engagement

Prior to submitting a proposal to conduct this verification, the following pre-planning steps were taken:

- The results of any previous business engagements or verifications with the Responsible Party were reviewed to determine if any previous unresolved conflicts may preclude ICF from engaging in the verification;
- The client's motivation for completing the verification was established; and
- A Conflict of Interest procedure was initiated that documents whether any perceived or real conflicts were found when considering threats due to:
  - Advocacy
  - Financial Interest
  - Familiarity/Sympathy
  - Intimidation
  - Self-Review
  - Incentives

Following the acceptance of the proposal and signing of a contract for services, the Verification Team was selected. The Verification Team for this engagement is comprised of the individuals identified in Section 3.

4.2 Approach

An extensive knowledge of the Responsible Party's business, the relevant industry, and the details of the Corporation (Responsible Party) itself are required to conduct a thorough verification that can lead to a conclusion. The initial information collected about the Responsible Party and its facilities formed the basis of the preliminary draft Verification Plan. The development of the Verification Plan is an iterative process; that is, the process will be completed several times through the course of the verification and the resulting plan will be updated as new information became available.

There are three types of risk associated with the GHG Assertion defined in ISO 14064-3:

- Inherent Risk
- Control Risk
- Detection Risk

The process of designing the Verification Plan involved the development of Verification Risk Assessment for the Responsible Party. The steps in this process include:

- Reviewing the GHG Assertion, and the methodologies employed by the Responsible Party;
- Assessing the likelihood that a material misstatement might exist in the GHG Assertion, if no controls were used to prevent misstatements in the GHG Assertion (i.e. inherent risk);
- Assessing the control environment and the corporate governance process (i.e. control risk); and
- Reviewing each emissions source identified by the Responsible Party, and evaluating the contribution of each source to the GHG Assertion and the associated potential material discrepancy for each.

The results of the Verification Risk Assessment inform the development of the verification procedures, which will be documented in Section 7 of this document, and a summary of the Verification Risk Assessment will be provided in Section 6. The Verification and Sampling Plans as well as the Verification Risk Assessment will be reviewed by the designated Technical Experts to ensure the verification procedures address each of the risks identified. The draft Verification Plan will be provided to the Responsible Party before proceeding with the verification.

4.3 Execution of Verification

With draft Verification and Sampling Plans in place, the verification procedures will be executed. This process involves collecting evidence, testing internal controls, conducting substantive testing, and developing a review file. Over the course of the verification, the draft Verification and Sampling Plans may change; the final Verification and Sampling Plans provided in the Verification Report reflect the verification parameters and procedures that were actually executed.

Site Visits

The site visit will be conducted by Julie Tartt and Kevin Johnson from January 22-24, 2018 inclusive in Arkansas and Texas. The site visit will be a key step in the planning and execution of

the verification. During the course of the site tours, the Verification Team will interview key operations personnel regarding the operations and data management of the Responsible Party.

During the course of the site visit and (potential) follow-up telephone interviews, the Verification Team will:

a) interview key site operations personnel regarding the operations and data management of one natural gas-fired generation facility in Texas (Lewis Creek), and one coal-fired generation facility in Arkansas (White Bluff)), to cross-check GHG data as well as gain a deeper understanding of GHG information systems and controls at plant level; and
b) undertake discussions with TRADES, Coal Supply, Gas Supply, CEMS Unit (all of these via meetings in The Woodlands, Texas), regarding data which they supply for purposes of the GHG Assertion, as well as related data and information management systems.

Key Entergy personnel to be interviewed on site or via telephone will include:

- Rick Johnson, Director, Environmental Strategy & Policy (based in New Orleans, LA but accompanying the Verification Team during the site tours)
- Mark Bowles, Director, Environmental Reporting & Climate
- Stanley Chivers and George Johnson, White Bluff Coal-Fired Power Plant
- Timothy Stone and Erik Hauser, Lewis Creek Gas-Fired Power Plant
- Grady Kaough, Power Trading
- Tad Chenet and Minh Nguyen, CEMS Unit
- Toby Chu and Kim Fuller, T&D Environmental Management
- Kyle Sannino, Energy Asset Confirmation
- Rachel Hill, Rail Car Management System (RCMS)/Coal Purchasing
- David Bruess, Gas & Oil Analytics

During the site visit all major GHG emissions sources for the White Bluff and Lewis Creek plants will be reviewed to ensure appropriate identification and categorization. A review of any available overall plant-level process flow and metering diagrams will be followed by physical observation of the facility, collection of relevant data and confirmatory checks (as possible) on meters and other equipment.

Collecting Evidence and Review of Documentation

Sufficiency and appropriateness are two interrelated concepts that are fundamental to the collection of verification evidence. The decision as to whether an adequate quantity (sufficiency) of evidence has been obtained is influenced by its quality (appropriateness).

Through the execution of the verification procedures described in Section 7 of the final Verification Plan, the Verification Team will review three key forms of evidence including physical, documentary and testimonial:

- Management documentation: policies, programs, and procedures related to the collection, safeguarding, and management of the data supporting the GHG Assertion;
- Records: records comprise time-sensitive data, correspondence, and files;

- Interviews: the interviews will provide information regarding operations and data management and will provide evidence to support the sufficiency of data controls; and
- Computer systems, i.e., those data systems used to capture and manage the GHG-related data and to calculate the GHG Assertion, will also be assessed by the Verification Team as part of this review.

The following are the key data systems which will be reviewed:

- TRADES – controllable power purchases tracking system: hourly purchase amounts from 1/1/2017 to 12/31/2017 inclusive will be extracted and sent via Excel to ICF by Grady Kaough (via Rick Johnson).
- CEMS data – for large fossil generating stations (as well as for small stationary sources that have CEMS).
- Gas purchases data – monthly for all gas-fired electric generating units – from David Bruess: purchase amounts input into ISB.
- Coal purchases data – from Rachel Hill (solid fuels): purchase amounts inputted into ISB.

Testing and Assessment of Internal Controls

The Verification Team will develop a sufficient understanding of the GHG information system and internal controls to determine whether the overall data management system is sound and if it supports the GHG Assertion. This assessment sought to identify any weakness or gaps in the controls that pose a significant risk of not preventing or correcting problems with the quality of the data and examining it for sources of potential errors, omissions, and misrepresentations. It will incorporate an examination of three aspects of the Responsible Party's internal controls: (1) the control environment, (2) the data systems, and (3) the control and maintenance procedures.

Assessment of Data

Substantive testing procedures will be used to assess the reasonability and validity of the GHG Assertion. Both quantitative and qualitative analysis will be performed to achieve the desired level of assurance. The verification procedures will be described in Section 7 of the final Verification Plan, as separate tables for each process or activity involved in the quantification and reporting of the GHG Assertion. The verification procedures include verification activities designed to:

- Review the Responsible Party's GHG inventory boundary, including a review of the completeness of emissions sources identified;
- Review the Responsible Party's data sources to ensure the GHG Assertion is calculated based on metered or estimated data;
- Re-calculate the GHG Assertion, which demonstrates transparency and accuracy; and
- Review the GHG Assertion to ensure the emissions calculated by the Responsible Party have been accurately reported.

Developing a Review File

A review file (the "File") comprised of documents, records, working papers and other evidence collected and created during the course of the review that support the review conclusions will be developed for this verification. This evidence stored in electronic format will serve to provide support for the verification conclusion, provide evidence that the verification was conducted in

accordance with the criteria set forth in this document, and aid the Verifier in conducting current and future reviews.

The File will include:

- The GHG Assertion and supporting documentation, to be used for reporting purposes by Entergy;
- Decisions on the level of materiality and the results of the Verification Risk Assessment;
- Documentation on the Responsible Party's internal controls;
- Descriptions of the controls assessment work and results;
- Documentation of the substantive testing procedures that were carried out and the results;
- Copies of any correspondence with the Responsible Party or other parties relevant to the review;
- The Verification Team's working papers; and
- Client data (copies of relevant records, spreadsheets, and other data files).

4.4 Completion

This engagement will be formally closed after the verification has been executed and the Verification Report has been finalized.

Preparing the Verification Report

The purpose of the Verification Report is to document the verification findings. All discrepancies are described and compared to the materiality threshold individually and in aggregate. The Verification Statement, which presents the Verification Team's verification conclusion, is included in the Verification Report.

Internal Peer Review Process

Prior to releasing the Verification Report and Verification Statement, an internal review process is conducted by the Internal Peer Reviewer. This process ensures that:

- All steps identified as being required to complete the verification were completed;
- Any identified material or immaterial discrepancies identified have been either:
  - corrected by the Responsible Party and reflected in the GHG Assertion; or
  - documented in the Verification Report, if discrepancies persist at the conclusion of the verification.
- All required documentation detailing the verification process has been prepared, delivered, and retained.

Closing the Engagement

The verification engagement will be closed out upon delivery of the final Verification Report.

5 Verification Schedule

The following schedule was planned for the verification (subject to change with agreement between the Verifier and the Responsible Party).

Description	Scheduled Date
Verification Kick-Off Meeting	November 29, 2017
Verification Planning Teleconference Meeting	December 12, 2017
Draft Verification Plan to Responsible Party	January 15, 2018
Data Requests	- January 17, 2018 (for White Bluff and Lewis Creek) - late January (for remaining requests)
Site Visits	January 22-24, 2018
Initial GHG Assertion Clarification Request	week of January 29, 2018
Draft Verification Statement and Report	February 27, 2018
Final Verification Statement and Report	March 2, 2018

6 Verification Risk Assessment

There are three types of risk associated with the GHG data management system and the GHG Assertion defined in ISO 14064-3:

- Inherent Risk
- Control Risk
- Detection Risk

The assessed level of risk for this verification dictates the degree of rigor planned for the verification procedures described in the accompanying Sampling Plan. Our established audit procedures and documentation systems ensured a thorough treatment of any risk identified, including determination of magnitude and sensitivity of that risk, during the assessment process. A qualitative risk assessment was completed based on observations made by reviewing and assessing accompanying documentation, as well as assessing available information such as the GHG inventory file, interviewing key personnel, and reviewing supporting documents.

The *inherent* risk in Entergy's corporate-wide 2017 GHG Assertion emanates from the large and complex nature of the company, the number of parties involved in managing their emissions inventory and developing their assertion, the number of emission sources, a large number of natural gas, oil and coal plants used in the process, and a smaller amount of controllable power purchases occurring throughout the year. Entergy Corporation 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, including nearly 9,000 megawatts of nuclear power, making it one of the nation's leading nuclear generators. Also, for the large CEMS-equipped generation units, because there are so many of them in Entergy's system (~37 units with significant operations in 2017, each contributing ~1% of Entergy's power generation GHG emissions or greater, and collectively contributing ~97% of Entergy's power generation GHG emissions), there would have to be multiple, long duration control failures to create errors which could lead to a material misstatement of Entergy's entity-wide inventory. For example, in the 2010 case of two highly unusual CEM system failures, which each went undetected for several months, while they affected 2010 GHG emissions of each unit by 5-10%, their collective impact on Entergy's overall 2010 corporate GHG inventory was less than 1%. Due to these reasons, in particular the sheer magnitude of Entergy's GHG footprint, the inherent risk has been assessed to be low.

Control risk relates to the likelihood that a material misstatement in the 2017 GHG Assertion will not be prevented or detected by Entergy's internal control and data management systems. Control risks will be assessed primarily by reviewing data controls and management systems for large fossil generating units and controllable purchased power, both comprising in aggregate approximately 96% of total company-wide emissions as noted in the 2017 GHG Assertion.

The largest control risk in relation to the 2017 GHG Assertion is likely to be the manual transcription method in which the inventory is prepared (i.e., emissions values are extracted from various sources and manually entered into an Excel spreadsheet; this is true for all emissions sources including the largest ones, namely stationary combustion and controllable purchased power). For purchased power, a number of data systems (e.g., TRADES) feed into ISB (intra-

system billing system). Both the individual data systems that comprise data input into ISB, as well as ISB itself, undergo QA/QC checks numerous times, both on a monthly and on an annualized basis. The Verification Team will request ISB to send a data extract from 2017, and will then triangulate it with data from TRADES and other sources for confirmatory checks.

For all of the large, CEMS-equipped fossil fuel electric generation units, which contributed approximately 87% of Entergy's total 2017 GHG emissions inventory, there are very rigorous measurement, monitoring, and reporting requirements established by the U.S. EPA. These CEMS monitoring programs, and their robust associated QA/QC activities, serve as the basis for demonstrating regulatory compliance with various federal Clean Air Act and state air permit compliance requirements. Also, the equipment utilized in these CEM systems are well established technologies with demonstrated track records of accuracy, precision, and reliability. In light of the abovementioned reasons, the control risk is assessed to be low.

The *detection risk* is a measure of the risk that the verification evidence collected and reviewed will fail to detect material misstatements, should such misstatements exist. Unlike *inherent* and *control* risks, which are typically attributes of the facility types and technologies employed therein, *detection* risk is variable but can be maintained at a low level by designing an appropriate number of tests, and collecting an adequate sample size. The Verification Team will conduct a number of sampling tests, focused on large fossil electric generation units and controllable purchased power. These tests are outlined in the sampling plan. Overall, the Verification Team's procedures have been designed to minimize detection risk. Our initial assessment is that detection risk will likely be low (in line with previous years' verification exercises), given the large number and appropriateness of the verification sampling/checking tests which are focused on the largest GHG inventory segments, i.e., CEMS units and power purchases (by relative magnitude), of Entergy's 2017 GHG Assertion. These tests have been designed and targeted at the greatest risk areas within Entergy's overall GHG inventory information management and data quality control system, namely the manual parts of the process.

7 Verification Procedures (Sampling Plan)

Summary of Procedures:

- Organization Boundaries and Definition
  - B1: Organization Boundaries, Infrastructure and Activities
  - B2: Review of Operating Conditions
- Calculation
  - C1: True Up and Re-Performance Calculation
  - C2: Minor/*De Minimus* Emissions – Methodology and Documentation
- Data Sources and Supporting Data
  - D1: Data Collection and Quality Controls
  - D2: Data Confirmation against External Sources
  - D3: Data Migration into Inventory
- Assertion
  - A1: Final Verification Assessment

Procedure Definition Table Explained

Z1 – Example Procedure Category – Example Procedure Title	
Introduction: This introduction serves to explain the reason the Verification Team is undertaking the procedures described below. For instance, the inclusion of all emission sources ensures that that quantification of the total direct emission satisfies the principle of completeness.	
Type of Evidence	The Type of Evidence can usually be grouped as: Physical Examination, Confirmation, Documentation, Observation, Inquiries of the Client, Re-performance, or Analytical Procedures.
Data Sources	The *Data Sources* describes the form in which the evidence is presumed or is known to be available to the Verification Team. Specific Documents or Assigned Positions, for example.
Objective (specific principles)	The objective serves to focus the procedure as pursuant to one or more of the audit principles of: *Relevance, Completeness, Consistency, Accuracy, or Transparency*.
Specific Activities	• The *Specific Activities* are outlined here.
Error Conditions	• The anticipated *Error Conditions* are listed here to aid the verification team; • As the Sampling Plan is a living document until the end of the verification process, additional error conditions may be identified during the execution of the procedures.

Facility Boundaries and Definition

B1 – Facility Boundaries, Infrastructure and Activities	
Introduction: This procedure evaluates the boundaries defined by the Responsible Party against the GHG Assertion.	
Type of Evidence	Documentation, Observation, Inquiries of the Client, Physical Examination
Data Sources	GHG Inventory Management Plan and Reporting Document (IMPRD), GHG Assertion, Previous GHG Assertions, Entergy Personnel, Annual Reports, Corporate Statistical Report
Objective (specific principles)	*Completeness, Consistency*
Specific Activities	1. Compare the GHG emission sources listed for the organization in the GHG Assertion against GHG emission sources listed in previous GHG Assertions; 2. Compare the GHG emission sources listed for the organization in the GHG Assertion against relevant annual reports, statistical report, and Entergy's website regarding operations and assets for completeness; 3. Compare the GHG emissions sources listed for the organization in the GHG Assertion against observations and discussions during site tour for completeness; 4. Interview Entergy personnel regarding changes to inventory or changes in the organization that have occurred in the current reporting period; 5. Interview relevant Entergy personnel regarding completeness of inventory described in the GHG Assertion; 6. Compare total emissions for each GHG emissions source in the current period against prior periods; 7. Evaluate the appropriateness and quantification of any *de minimus* emission sources.
Error Conditions	GHG emission sources that are not reported in the GHG Assertion.

B2 – Review of Operating Conditions	
Introduction: This procedure utilizes analytical procedures to identify changes in the scope of the GHG Assertion. This procedure was largely completed during the verification planning stage.	
Type of Evidence	Analytical Procedures, Inquiries of the Client, Documentation (i.e., IMPRD)
Data Sources	GHG Assertion, Entergy Personnel, Data from major sources such as fossil generation units and purchased power
Objective (specific principles)	*Consistency, Completeness*
Specific Activities	1. Interview Entergy personnel regarding any operational issues that may have caused a significant change to the reported emissions (e.g. asset acquisitions/divestitures, change in service/product offering); 2. Compare total emissions for each GHG emissions source in the current period against prior periods.
Error Conditions	Significant changes in emissions (including wide variances between 2017 data vs. earlier years, particularly for fossil units, such as CEMS data, or purchased power amounts, through ISB) do not constitute an error condition, but do warrant further investigation and clarifications.

Calculation

<table>
<tr><th colspan="2">C1: True Up and Re-Performance Calculations</th></tr>
<tr><td colspan="2">Introduction: As part of verification procedures, the Verification Team checked calculations for each emissions source, with an emphasis on large stationary fossil plants (CEMS units), purchased power and small stationary units which together comprise over 97% of total corporate-wide GHG emissions for 2017. In order to ensure the accuracy of the GHG Assertion, the objective of this procedure is re-perform the calculations independent from the calculations performed by Entergy.</td></tr>
<tr><td>Type of Evidence</td><td>Documentation, Re-performance</td></tr>
<tr><td>Data Sources</td><td>1. Large stationary fossil plants:
a. a. Selected CEMS reports, 20 in total (from Tad Chenet/Minh Nguyen, and the plant site visit contacts at Lewis Creek and White Bluff); sampling is at the smallest units corresponding to ~1% of total direct emissions (~0.5% of total ETR emissions), expected to represent in total approximately 64% of Entergy power generation direct emissions. These are:
<u>Coal</u>
• Independence 1
• Independence 2
• RS Nelson 6
• White Bluff 1
• White Bluff 2

<u>Gas</u>
• Hinds H01
• Hinds H02
• Hot Spring CT-1
• Hot Spring CT-2
• Lewis Creek 1
• Lewis Creek 2
• Little Gypsy 2
• Little Gypsy 3
• Ninemile Point 4
• Ninemile Point 5
• Ninemile Point 6A
• Ninemile Point 6B
• Sabine 3
• Sabine 4
• Sabine 5</td></tr>
</table>

	b. Coal purchasing (Rachel Hill) plant daily coal burn data, and six (6) short-term test burns data for three (3) coal plants. c. Gas purchasing (Dave Bruess) gas burn data – all plants – monthly basis. d. d. CEMS supporting documentation and QA/QC back-up data for selected audit sample units.
Objective (specific principles)	*Accuracy, Transparency*
Specific Activities	<u>General</u> 1. Review documentation for completeness 2. Recalculate emissions numbers 3. Perform checks <u>Emissions Factors</u> 4. Calculate emissions from each emission source category from each sampled Facility 5. Confirm and re-calculate (if applicable) emission factors against independent reference material
Potential Error Conditions	<u>General</u> • Disagreement between calculated and reported values; • Disagreement between allocated values or inconsistent methodology. <u>Emissions Factors</u> • Incorrect or out of date emissions factors
Sample Unit	1. <u>Purchased Power</u>: a. All controllable trades (daily) extract in Excel b. Emissions totals for total purchased power on monthly basis c. Possible extract directly from ISB to be able to triangulate with daily or monthly purchased power data. <u>2. Large stationary fossil plants:</u> a. 20 units selected for sampling in relation to EPA CAM AMPD database checks, representing ~64% of Entergy's power generation direct emissions levels, including CEMS reports for the following coal-fired and gas-fired units– request made to Tad Chenet/Minh Nguyen at Fossil Environmental, or to the respective Entergy site visit environmental contact : **<u>Coal Units</u>** • Independence 1

	• Independence 2 • RS Nelson 6 • White Bluff 1 • White Bluff 2 **Gas Units** • Hinds 1/2 • Hot Spring CT-1/CT-2 • Lewis Creek 1 • Lewis Creek 2 • Little Gypsy 2 • Little Gypsy 3 • Ninemile Point 4 • Ninemile Point 5 • Ninemile Point 6A/6B • Sabine 3 • Sabine 4 • Sabine 5 For each of the above CEMS-equipped gas or coal-fired units, the Verification Team requested the following information for calendar year 2017: • Gas flow meter accuracy test/CEMS gas flow transmitter calibration analysis, or stack gas CO2 CEMS if so equipped (gas-fired units) • CO2 and stack gas flow meter CEMS relative accuracy test audit (RATA) annual test results (coal-fired units) • CO2 CEMS quarterly linearity checks (coal-fired units) • ECPMS (emissions collection and monitoring plan system) feedback reports: Q4 For the gas units at Lewis Creek and the coal units at White Bluff, the Verification Team requested similar information as above from the respective environmental manager on site, including hourly CO2 data for 2017 from the on-site CEMS data acquisition and handling systems (DAHS). 3. Small stationary plants and combustion units – check "fossil fuel generating stations" emissions against EPA GHGRP data for 2016 for confirmatory checks against data and emissions numbers in the 2017 GHG Assertion.

Sample Size	All emissions sources and values for: • Purchased power (controllable trades) • Large stationary fossil plants listed in Sample Unit section, above • Small stationary combustion sources

C2 – Minor/*De Minimus* Emissions - Methodology and Documentation	
Introduction: In order to ensure that all relevant emission sources are included in the GHG Assertion, it is necessary to confirm that any *de minimus* emission sources have been appropriately excluded.	
Type of Evidence	Documentation, Discussions with Entergy's Director of Environmental Reporting and Climate
Data Sources	2017 GHG Assertion, IMPRD
Objective (specific principles)	*Accuracy, Transparency*
Specific Activities	1. Review minor/*de minimus* sources and discuss with Entergy Environmental Manager 2. Re-calculate emissions, where data is available 3. Compare to earlier year inventories (2011-2016)
Potential Error Conditions	Material emission source(s) improperly excluded from GHG Assertion
Sample Unit	N/A
Sample Size	Minor/*de minimus* emission categories and sources

Data Sources and Supporting Data

D1 – Data Collection and Quality Controls	
Introduction: This procedure is intended to systematically review the Responsible Party's internal procedures and controls that are used to calculate the GHG Assertion.	
Type of Evidence	Documentation, Confirmation, Observation, Inquiries of the Client, Analytical Procedures
Data Sources	Data systems personnel, Entergy personnel, Standard Operating Procedures and Manuals
Objective (specific principles)	*Completeness, Consistency, Accuracy, Transparency*
Specific Activities	1. Observe or interview Entergy personnel regarding the operation of data transfer systems, including manual data entry procedures and associated controls; 2. Review or interview Entergy personnel regarding on-site sampling, laboratory and other analytical procedures; 3. Compare original data sources to data in calculation systems for consistency.
Error Conditions	• Inconsistency between raw data and data supporting the 2017 GHG Assertion • Inconsistency and/or unclear links between information management systems that are of the most relevance to the underlying data for the 2017 GHG Assertion

D2 – Data Confirmation against External Sources	
Introduction: Where possible, this verification procedure is used to gather external evidence to confirm data sources used to quantify reported emissions.	
Type of Evidence	Confirmation, Analytical Procedures
Data Sources	Inventory Report and supporting external data/information: 1. Large fossil generating stations: a. CEMS data – EPA CAM AMPD emissions database query reports and select ECMPS reports. b. Gas and coal burn data – monthly for all gas plants and daily data for all coal plants sampled (all 12 months for 2017); two sets of select daily burn data for RS Nelson 6, Independence and White Bluff plants. c. All CEMS-related QA/QC documentation for Lewis Creek and White Bluff units, and hourly CO_2 data for those units. 2. Small Stationary Combustion Sources – 2016 EPA GHG Reporting Program data submitted for all fossil generating stations.
Objective (specific principles)	*Accuracy*
Specific Activities	1. Review use of external data sources in GHG inventory for appropriateness 2. Compare reported/metered values to those provided by secondary sources
Potential Error Conditions	Unexplained, major discrepancy between metered/reported values and secondary source
Sample Unit	Typically monthly or annual data primarily, with some cross-checks on daily data as relevant

Sample Size	1. Large fossil generating stations: a. CEMS data and select ECMPS reports – for 20 gas and coal-fired units (representing ~64% of Entergy power generation direct GHG emissions). b. Gas and coal burn data – monthly (all 12 months for 2017) for all gas plants, and daily data for all coal plants; and two sets of select daily data for Independence, RS Nelson 6, and White Bluff plants. c. All CEMS-related QA/QC documentation for all Lewis Creek and White Bluff units, and hourly DAHS CO_2 emissions data for each. 2. Small stationary combustion sources – annual 2016 EPA GHG Reporting Program data submitted for all fossil generating stations.

D3 – Data Migration into Inventory	
Introduction: This procedure is intended to review the transfer of data from calculations into the final GHG Assertion, including any summary calculations that were required.	
Type of Evidence	Documentation, Re-Performance
Data Sources	Inventory Report, IMPRD, discussions with Entergy's Environmental Strategy & Policy Director
Objective (specific principles)	*Accuracy, Transparency*
Specific Activities	1. Recalculate summary calculations performed by Entergy; 2. Compare calculated values to those in the GHG Assertion for transcription accuracy.
Potential Error Conditions	Discrepancy between summary totals and individual sector values reported in GHG Assertion
Sample Unit	Data reported in the final GHG Assertion
Sample Size	All relevant information and emissions values

Assertion

A1 – Final Verification Assessment	
Introduction: This procedure is intended as a final review of Entergy's 2017 GHG Assertion to ensure all required information is complete and all relevant documentation is included.	
Type of Evidence	Documentation
Data Sources	GHG Assertion
Objective (specific principles)	*Completeness*
Specific Activities	1. Review the GHG Assertion and IMPRD for completeness and current information; 2. Provide Responsible Party with documentation, namely a Verification Statement and Report for voluntary reporting purposes.
Potential Error Conditions	Incomplete, inaccurate, or missing information in the GHG Assertion
Sample Unit	Data fields in the GHG Assertion
Sample Size	All fields in the GHG Assertion

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.
11	03/08/13	Revised based on findings during verification audit of 2012 GHG Inventory	Various editorial changes; updated plant acquisitions during 2012
12	03/07/14	Revised based on findings during verification audit of 2013 GHG Inventory	Various editorial changes; updated to reflect plant divestitures during 2013, inclusion of off-site power for plants out of utility territory, discussion of transition to MISO, updated internal website address
13	03/09/14	Revised to reflect changes caused by transition to MISO and based on findings during verification audit of 2014 GHG Inventory	Various editorial changes; updated to reflect new plant started up in 2014, described impacts of MISO transition, updated website addresses
14	03/11/15	Revised based on findings during verification audit of	Various editorial changes; updated plant sales

		2012 GHG Inventory	
15	**03/02/17**	**Revised based on findings during verification audit of 2016 GHG Inventory**	**Various editorial changes; updated to reflect plant acquisition and divestitures closed during 2016.**
16	**03/09/18**	**Revised based on findings during verification audit of 2017 GHG Inventory**	**Various editorial changes; added Attala and removed Attachment 2 to avoid confusion.**