

## TI Greenhouse Gas Emissions Inventory Management Plan

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## I. Overview

This greenhouse gas (GHG) Inventory Management Plan (IMP) provides a framework for the management of GHG accounting within Texas Instruments Incorporated (TI). The TI IMP, contents and associated processes are the responsibility of the Worldwide Environment Safety and Health (WWESH) organization at TI.

## II. Purpose

This IMP outlines the data collection methods to capture TI's global GHG emissions, the GHG reporting methodologies used, and the tools required to ensure the completeness, accuracy and reliability of the GHG inventory for TI. It describes the scope of TI's GHG inventory, the data sources, quantification methods, emission factors, and data management processes used. It also documents the processes in place to collect and review the data including the roles and responsibilities for managing the annual inventory of TI's global emissions. This facilitates the GHG quantification and inventory verification processes and provide TI with a reference to use for updating the GHG inventory in future years.

This document will be reviewed following the annual reporting in each year, and updated when the inventory scope or data processes are significantly changed. The inventory data is compiled and reported annually.

## III. Organizational and Operational Boundaries

Boundary identification is necessary to define the facilities and operations to be included in TI's GHG inventory, and determine the emission source types from which GHG emissions are to be accounted for in the inventory.

TI uses the financial control approach as the basis for determining its organizational boundary. Using this approach, TI accounts for the GHG emissions from operations over which it has the ability to direct financial and operating policies with a view toward gaining economic benefit from such operations.

Leased office buildings and gas plants subject to contracts that are considered 'embedded leases' by TI for financial accounting purposes have been included in TI's organizational and operational boundary as listed in the file *Boundary determination\_February 2023\_v3\_Final\_(2022 and 2023).xls*.

TI has excluded small sites from its organizational boundary. Small sites are those with aggregated building space under 50,000 square feet including leased design and sales offices equal to or less than 50,000 square feet. TI reports by site, not building, therefore a site can be a single building or a group of buildings. A small site does not include manufacturing sites. The site size is based on TI's Total Physical Facilities Report (TPFR) used to develop the "Properties" disclosure in a similar geographic area and is reported in TI's 10-K, which lists TI's "materially important physical properties."

TI considers emissions from these multiple small sites including design and sales offices to be *de minimis* because they account for less than one percent of TI's total worldwide scope 1 and scope 2 GHG emissions. TI has little or no visibility into GHG emissions resulting from these offices (*e.g.*, resulting from building emissions or purchased electricity).

Operational boundaries define which types of GHG emissions sources are included in the GHG inventory. The types of emissions are categorized by scope – scope 1 are direct emissions from sources owned or controlled by TI, scope 2 are purchased electricity and scope 3 are value chain emissions that are a consequence of TI's operations but occur at or from sources owned or controlled by another company.

#### IV. Facilities List

A list of TI facilities is found in the TPFR, and those sites determined to be included in TI's organizational boundary are itemized in the file *Boundary determination\_February 2023\_v3\_Final\_(2022 and 2023).xls*. Scope 2 emissions from electricity are included in our inventory, as specified for each site.

#### V. GHG List

TI follows The Greenhouse Gas Protocol Corporate Accounting & Reporting Standard from WBCSD/WRI for general guidance on GHG emissions accounting. TI's inventoried GHG emissions are primarily from process gases and fuel usage (scope 1 emissions) and purchased energy (scope 2 emissions). TI follows the EPA Mandatory Reporting Rule Subpart I in monitoring and reporting of GHG emissions within the US and the IPCC 2006 methodology for reporting GHG emissions. Transition to using the IPCC 2019 methodology for all TI sites is expected by 2025.

Table 1 below lists the GHGs which are included in TI's GHG emissions inventory, with the global warming potentials as referenced by the IPCC Assessment.

GHG Gas	Common Name	GWP	Reference
CO <sub>2</sub>	Carbon dioxide	1	IPCC Fourth Assessment Report (AR4 - 100 year)
CH <sub>4</sub>	Methane	25	IPCC Fourth Assessment Report (AR4 - 100 year)
N <sub>2</sub> O	Nitrous oxide	298	IPCC Fourth Assessment Report (AR4 - 100 year)
CF <sub>4</sub>	PFC-14	7,390	IPCC Fourth Assessment Report (AR4 - 100 year)
C <sub>2</sub> F <sub>6</sub>	PFC-116	12,200	IPCC Fourth Assessment Report (AR4 - 100 year)

C <sub>3</sub> F <sub>8</sub>	perfluoropropane	8,830	IPCC Fourth Assessment Report (AR4 - 100 year)
C <sub>4</sub> F <sub>8</sub>	perfluorocyclobutane	10,300	IPCC Fourth Assessment Report (AR4 - 100 year)
SF <sub>6</sub>	Sulphur hexafluoride	22,800	IPCC Fourth Assessment Report (AR4 - 100 year)
NF <sub>3</sub>	Nitrogen trifluoride	17,200	IPCC Fourth Assessment Report (AR4 - 100 year)

*Table 1: List of key GHGs included in TI's GHG emissions inventory*

The global warming potential provided is a factor describing the radiative forcing impact (degree of harm to the atmosphere) of one unit of a given GHG relative to one unit of CO<sub>2</sub>.

A complete list of GHG's and their respective Global Warming Potential (GWP) Values are provided by the GHG Protocol at this [link](#).

## VI. Emission Source Identification Procedure

### Process emissions:

TI consumes Perfluorocarbons (PFCs), Hydrofluorocarbons (HFCs), Sulfur hexafluoride (SF<sub>6</sub>) and Nitrogen trifluoride (NF<sub>3</sub>) in the manufacture of semiconductor products. It also produces some PFC compounds as byproducts of chemical reactions. The amount emitted is the net of consumption, by-product of production, and abatement. The net emitted amount of these compounds is reported.

### Scope 1 fuels and scope 2:

TI identifies energy resources being consumed through purchasing records. Through 2022, TI has implemented a 3<sup>rd</sup> party vendor program, Watchwire, which will collect electricity data. Data from energy sources used Energy sources being reported include electricity, natural gas, #1 and #2 diesel oil, #6 fuel oil, Motor gasoline, Liquefied Natural Gas (LNG), Propane, and hot water purchased from a third party (district heating).

## VII. Direct Sources

### Scope 1 Process emissions:

The GHG inventory includes process emissions used in semiconductor manufacturing which include perfluorocarbons (PFC), hydrofluorocarbons (HFC), sulfur hexafluoride (SF<sub>6</sub>), nitrogen trifluoride (NF<sub>3</sub>), and nitrous oxide (N<sub>2</sub>O). As part of the manufacturing process, some additional quantities of these compounds are produced as byproducts. Not all of the compounds purchased or produced are emitted to the atmosphere, due to the fact that some compounds are destroyed

in the manufacturing process or in abatement devices. Only the net amounts released are reported. In addition, there are emissions related to the direct combustion of fuels at TI sites from the burning of natural gas or other fossil fuels. All Scope 1 emissions are consistent with guidelines on semiconductor inventories provided by EPA Mandatory Greenhouse Gas Reporting Rule and the Intergovernmental Panel on Climate Change Guidance for Greenhouse Gas Inventories.

**Fluorinated heat transfer fluids:**

FHTFs (fluorinated heat transfer fluids) are not included in our GHG inventory due to the varying methodologies used across the sites in which TI operates. When the US EPA introduced their GHG rules, they included FHTFs, so while we do not include FHTFs in our voluntary reporting (CCR), we did report US site emissions to EPA. Recently, WSC has achieved agreement that all regions will move to 2019 IPCC (the latest IPCC revision used by our international sites) and include FHTFs.

**Stationary Equipment sources:**

Direct sources include energy consumed by site stationary equipment such as boilers, exhaust abatement and diesel fuel for emergency generators.

**Mobile sources:**

The emissions from various TI-owned mobile sources such as propane used in forklift operations onsite are included and updated. All such sources are managed by the TI facilities teams at each TI location and uploaded into our corporate metrics calculations. In 2022, we added jet fuel, used in TI owned jets used for business travel.

**VIII. Indirect Sources****Scope 2 emissions:**

Scope 2 emissions are primarily electricity consumption at all TI sites. Emissions are not included from TI's multiple small sales offices and design centers which are leased, and account for less than 1% of TI's GHG emissions.

Indirect sources include the purchase of electricity at each TI facility as well as district heating distributed to the Freising facility by a co-generation (combined heat and power) plant. TI does not export any energy.

**Scope 3 emissions:**

TI obtains and reports indirect emissions related to employee travel as provided from its travel partner. TI is currently reviewing other scope 3 emission categories for relevance to TI's operations and feasibility of calculating.

## **IX. Quantification Method**

Emissions were calculated for energy sources using default CO<sub>2</sub> factors from the following sources:

### Electricity consumed:

In 2022, TI implemented a program (Watchwire) to automate data collection of utility bills and calculate the GHG emissions associated with the energy used. TI uses the most recent version of US EPA e-GRID and applies the factors to the current year. For example, in reporting for 2022, we used the e-Grid data available as of 02/15/2023. For international sites, we use the latest factors supplied by the International Energy Agency (IEA) as provided through our Watchwire subscription. Watchwire will apply updated emissions factors such as those published by e-Grid and IEA.

TI also reports market based numbers for countries where residual mix data is available and for locations where we engage in contracts for low carbon or renewable energy electricity, or where we self-generate energy. Residual mix factors are sourced from the latest versions of Green-e or AIB where used.

### Fuels burned in Stationary sources worldwide:

Data is collected at each site, usually based on the invoices received for the fuel consumed onsite. The GHG emissions are usually calculated from fuel usage, using the purchase or delivery information. Some sites monitor usage where they have meters and calibration devices installed.

### District Heat (Imported Hot water):

District heat applies only for the TI site at Freising, Germany. Data are collected from calibrated and sealed heat meters, that are owned by the district heating supplier. Three district heating stations with separate heat meters are installed in Freising; two for office buildings, one for the fab. District heating amounts and associated cost are invoiced annually. Emissions factors are applied by the supplier, based on the averages of the fuel mix used to generate heat, as governed by the German energy authorities.

A heat meter or flux calorimeter is a device which measures thermal energy provided by a source or delivered to a sink, by measuring the flow rate of the heat transfer fluid and the change in its temperature ( $\Delta T$ ) between the outflow and return legs of the system. It is typically used in

industrial plants for measuring boiler output and heat taken by process, and for district heating systems to measure the heat delivered to consumers.

## **X. Activity Data**

The quantities of utilities consumed each month (electricity, natural gas, #2 diesel, #6 fuel oil, imported hot water, gasoline, liquefied natural gas, and propane) are taken from delivery invoices from each of the facilities respective energy suppliers.

TI is evaluating an way to track emissions in an automated way, referred to as scope 1 automation project. The quantity of PFCs, SF6 and NF3 that are emitted to the atmosphere are calculated by site environmental engineers. They are initially taken from inventory records, increased by any amounts created by the processes, and then reduce by the amount abated or destroyed. The net amounts released are reported to TI WWESH annually, along with the calculations used to determine the net.

## **XI. Data Management**

### Scope 1 fuels and scope 2:

In 2022, TI implemented an automated program (Watchwire) to automate data collection of utility bills. The data will primarily be populated electronically directly from the utility supplier into the database. In other instances, TI site teams will email invoices to Watchwire where data is uploaded to the database, and in some cases, data may be manually entered.

### Process Emissions:

Environmental Specialists at each facility collect updated tool information from equipment engineers in the manufacturing facility on an annual basis. This data will be collected though the automation process in the future. This data is calculated using relevant methodologies.

### Frequency

Utility data is reported to the corporate level on a monthly or quarterly basis into the Watchwire database.

Process emission data including perfluorocarbons (PFC), hydrofluorocarbons (HFC), sulfur hexafluoride (SF6), nitrogen trifluoride (NF3), and nitrous oxide (N2O) is reported annually according to the US EPA's mandatory reporting requirements for US sites. The scope 1 automation project will allow data to be collected as it is used from the tools.

## **XII. Quality Assurance**

Data is reviewed for accuracy at several levels in preparation for reporting. Scope 1 automation project implemented through 2022 ensures that real-time data is collected from all tools. Exceptions will be highlighted and investigated for accuracy. Scope 2 data utilizes the Watchwire program which automatically audits new data against historic data to identify exceptions, which are then highlighted for review and correction. Automatic audits include checks for gaps in billing periods, including abnormally long periods, and daily and total variance of usage and cost against prior invoices.

A second level of quality assurance is performed by the WWESH energy team. This includes a review of the automated audit results and explanations entered by the sites, as well as review of consumption trend graphs. Selected consumption data is also checked against invoiced consumption. The WWESH energy team also checks with all sites at least annually to check whether there have been any changes in energy consumption, for instance new or removed utility accounts.

## **XIII. Base Year and Base Year Adjustments**

TI has selected to use the fixed base year approach and chose 2015 as its base year for comparatively tracking its GHG emissions over time. TI chose 2015 as a base year because it was:

- one of the first years for which TI had comprehensive, reliable GHG emissions data from within its organizational and operational GHG emissions boundaries; and
- the beginning of the first period for which TI set an absolute GHG emissions reduction goal.

TI will make base year adjustments when it experiences structural changes, changes in activity data, or discovers significant errors in past GHG emissions calculations. Recalculations to the base year will be triggered if there is a significant threshold reached in any of the changes listed above. TI defines significant threshold reached, if the change threshold is equal to or greater than 10 percent of the base year emissions.

TI will use the fixed base year approach as defined by the GHG protocol. In the case of a structural change such as an acquisition, emissions sources from an acquired company are included both with their emissions in the base year (when TI did not control these sources yet) and in the current year of the structural change. Similarly, emission sources from divested facilities will be excluded both with their emissions in the base year (when they were still controlled by TI) and in the current year.



#### **XIV. Roles and Responsibilities**

The purpose of this section is to describe the roles and responsibilities for input and upkeep of data management procedures and data sources.

Specific staff members assigned to manage the company’s annual GHG emissions inventory could change, so this document highlights the procedures, company departments involved, and data management processes necessary to manage the GHG inventory.

As TI has many people responsible at different levels, this is provided at a high level. General Roles and Responsibilities are detailed in the following table.

<b>Responsibility</b>	<b>TI Role</b>	<b>Current Responsible Person / Supervisor</b>
Regulatory Reporting and Scope 1 Process emissions inventory	Worldwide Environment, Safety & Health (WWESH)	Jack Chang / Joe Bauer
Energy management data and reporting (Scope 1 and 2)	Worldwide Facilities (WWF)WWESH Energy Team	Mike Braby / Rob Jackson/ Shawn McGlothlin
Voluntary Reporting emissions inventory to CCR, SIA, and CDP	Worldwide Environment, Safety & Health (WWESH)	Sheryl Lawry /Lindsey Richmond

*Table 2: GHG Inventory Roles and Responsibilities*

#### **XV. Auditing and Verification**

TI engages with a third-party verification body annually to assure the GHG inventory, including scope 1 and scope 2 data. The assurance statement is posted online with our Corporate Citizenship Report (CCR) which is published annually, and with our CDP response. Results are discussed with the verifier, and significant findings will result in changes to the management of the GHG inventory.

#### **XVI. Reporting**

TI reports GHG emissions data and related information as outlined in this document to various regulatory and voluntary bodies and consortia. We also publish in our Corporate Citizenship Report published annually.

TI’s GHG data or subsets of data is reported to various external organizations, including:

Mandatory Reporting:

- The US EPA Mandatory Reporting Rule subpart I – (Electronics Manufacturing),  
 Reference: <https://www.epa.gov/ghgreporting/subpart-i-electronics-manufacturing>

Voluntary Reporting:

- The Semiconductor Industry Association (SIA),  
Reference: <https://www.semiconductors.org/>
- Japan Electronics and Information Technology Industries Association (JEITA),  
Reference: <https://www.jeita.or.jp/english/>
- China Semiconductor Industry Association,  
Reference: <http://www.csia.net.cn/wsc/>
- The CDP (formerly the Carbon Disclosure Project),  
Reference: <https://www.cdp.net/en>
- TI Corporate Citizenship Report,  
Reference:  
<https://www.ti.com/about-ti/citizenship-community/overview.html>

## XVII. References

This IMP was completed using the guidance of The World Resources Institute/WBCSD (WRI/WBCSD) Greenhouse Gas Protocol’s Corporate Accounting and Reporting Standard, the current international standard for corporate greenhouse gas inventories, as well as U.S. EPA’s Center for Corporate Climate Leadership Inventory Management Plan guidance.

The following references are used to develop TI’s IMP:

Description	Link
The Greenhouse Gas Protocol, A Corporate Accounting and Reporting Standard, Revised Edition, World Business Council for Sustainable Development (WBCSD) and the World Resources Institute (WRI).	<a href="https://ghgprotocol.org/corporate-standard">https://ghgprotocol.org/corporate-standard</a>
EPA Climate Leaders	<a href="https://www.epa.gov/climateleadership">https://www.epa.gov/climateleadership</a>
Mandatory Reporting Rule Subpart I	<a href="https://www.epa.gov/ghgreporting/subpart-i-electronics-manufacturing">https://www.epa.gov/ghgreporting/subpart-i-electronics-manufacturing</a>
IPCC	<a href="http://www.ipcc.ch/">http://www.ipcc.ch/</a>
IPCC Changes in Atmospheric Constituents and in Radiative Forcing	<a href="https://www.ipcc.ch/publications_and_data/ar4/wg1/en/ch2s2-10-2.html">https://www.ipcc.ch/publications_and_data/ar4/wg1/en/ch2s2-10-2.html</a>

*Table 3: References and links*

**XVIII. Revision History**

<b>Revision</b>	<b>Comment</b>	<b>Editor/ Approval</b>
09/06/2017	Develop document incorporating current TI practices and procedures	Sheryl Lawry
12/12/2022	Update to GHG inventory and sites	Sheryl Lawry
01/31/2023	Major revisions reflecting changes through 2022	Sheryl Lawry

*Table 4: Revision history*