GCS Holdings, Inc.

2025

Greenhouse Gas Inventory Report

Issue Date: April 2026

First Edition

Content

List of Table

List of Figures

Chapter 1: Company Overview and Policy Statement

1.1 Preface

Global warming is one of the most pressing challenges of our time, with unprecedented impacts spanning the environment, ecology, economy, society, and human health. GCS Holdings, Inc. upholds the principle of sustainable operations, actively addressing climate change and aligning with international environmental trends. To enhance resource efficiency, fulfill corporate social responsibility, and transparently disclose greenhouse gas (GHG) reduction commitments in our ESG sustainability report, the company has initiated an organizational GHG inventory from 2024 onward. This effort includes establishing a GHG management system for our facilities and aligning with government policies to achieve carbon reduction targets.

This inventory report is compiled in accordance with the ISO 14064-1:2018 standard, the IPCC 2019 guidelines, and the Greenhouse Gas Protocol (GHG Protocol). A systematic approach has been adopted to establish an emissions inventory and registry, ensuring the integrity of internal document management and verification processes. This report serves as a foundation for future carbon reduction initiatives, reinforcing our corporate responsibility and contributing to the sustainability of our planet.

1.2 Company Overview

Founded in 1997 in California, USA, GCS Holdings, Inc. is an ISO-certified, leading global pure-play compound semiconductor (III-V materials: Gallium Arsenide (GaAs), Indium Phosphide (InP), and Gallium Nitride (GaN)) foundry. The company specializes in advanced manufacturing technologies to produce high-performance, high-quality semiconductor components. Its product portfolio includes radio frequency integrated circuits (RFICs) and millimeter-wave integrated circuits for the wireless communication market, power devices for the power electronics market, and photodetectors and laser diodes for fiber-optic communication applications.

In addition to wafer foundry services, GCS also develops, manufactures, and sells its proprietary optical wafers and chips under the "GCS Known Good Die"™ brand. These products include GaAs and InGaAs detector chips and detector arrays, avalanche photodiode (APD) chips, and vertical-cavity surface-emitting laser (VCSEL) chips and arrays.

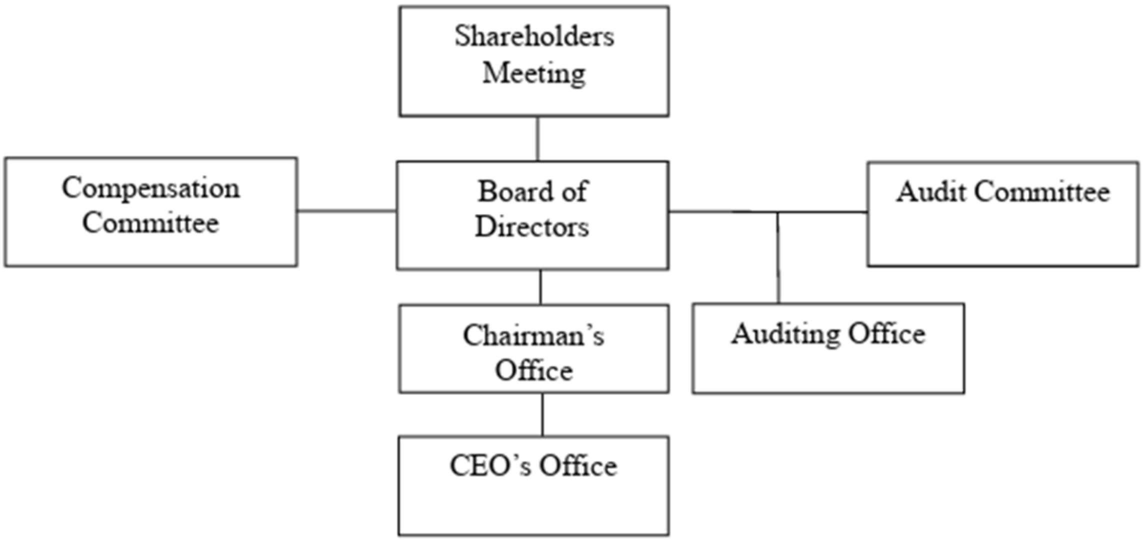

Figure 1.1 Organizational structure

1.3 Organizational Structure and Implementation

To ensure the effective implementation of the greenhouse gas (GHG) inventory, GCS Holdings, Inc. established a GHG Task Force in 2024, composed of senior executives and representatives from various departments. In the same year, the company formally launched the GHG Inventory Task Force, initiating the 2024 ISO 14064-1 GHG emissions inventory process to comprehensively track and manage emissions. The organizational structure of the GHG Task Force is illustrated in Figure 1.2.

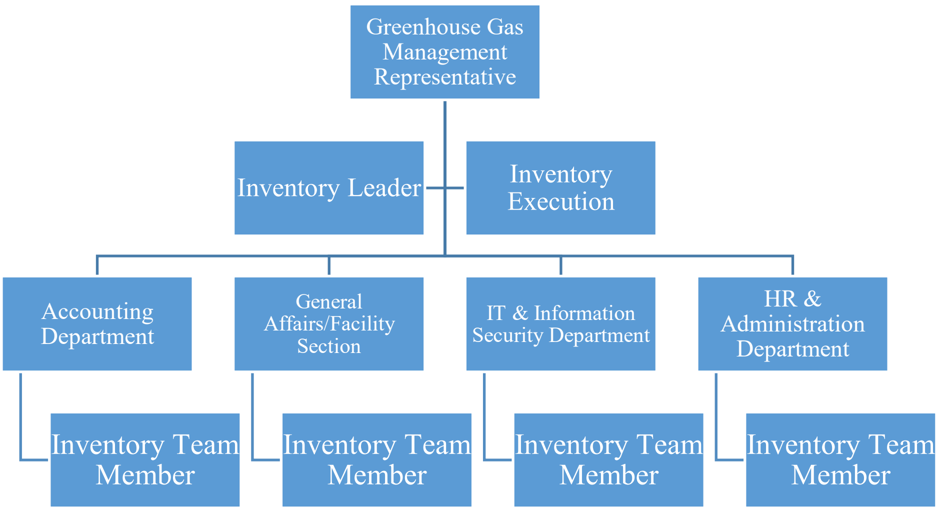

Figure 1.2 Greenhouse Gas Task Force Organizational Structure

1.4 History and Development

Year	History and Development
2024	● Capital injection into material subsidiary Global Communication Semiconductors, LLC ● Disposition of equity interest in Unikorn Semiconductor Corp.
2023	● Partial divestment of equity in Changzhou Chengxin Semiconductor Co., Ltd. ● Completion of liquidation of Taiwan subsidiary Yutong Semiconductor Technology Co., Ltd.
2022	Private placement issuance of 20 million common shares for capital increase.
2021	Divestment of Chinese subsidiary Changzhou Hanjia Semiconductor Co., Ltd. to joint venture Shanghai Zhoujia Optoelectronics Co., Ltd.
2020	● Investment in Chinese subsidiary Changzhou Hanjia Semiconductor Co., Ltd. ● Deregistration of Xiamen San'an HuanYu Integrated Circuit Co., Ltd.
2019	● Establishment of Taiwan subsidiary Yutong Semiconductor Technology Co., Ltd. ● Signing of a strategic cooperation agreement with Epistar Corporation. ● Issuance of Global Depositary Receipts (GDRs) on the Luxembourg Stock Exchange.
2018	● Completion of an additional 2% equity acquisition in Xiamen San'an HuanYu Integrated Circuit Co., Ltd. ● Board resolution to sign an equity transfer agreement, acquiring 2% equity in Xiamen San'an HuanYu Integrated Circuit Co., Ltd. from Xiamen San'an Integrated Circuit Co., Ltd.
2017	GCS, USA acquired 100% equity of D-Tech Optoelectronics, Inc. and its subsidiary D-Tech Optoelectronics Co., Ltd. through a cash transaction.
2016	● Board resolution to sign a joint venture agreement with Xiamen San'an Integrated Circuit Co., Ltd., establishing Xiamen Global Advanced Semiconductor Co., Ltd. ● Launched 6-inch vertical-cavity surface-emitting laser (VCSEL) wafer fab foundry services. ● Board resolution to terminate the merger with SAIC Acquisition, Inc., a wholly-owned subsidiary of Xiamen San'an Integrated Circuit Co., Ltd., and signed a termination agreement. ● Mass production of silicon carbide junction field-effect transistors (SiC JFETs). ● Board approval for the merger with SAIC Acquisition, Inc., a wholly-owned subsidiary of Xiamen San'an Integrated Circuit Co., Ltd.
2015	● Completion of optoelectronic foundry process developments for 100G/400G InP photonic integrated circuits (InP-PIC) and InP/silicon photonic integrated circuits (InP/SiPIC). ● Successfully developed a high-speed, low-loss planar RF PIN diode. ● Mass production of 25G 850nm GaAs PIN photodetectors (PDs). ● Mass production of 25G 1310-1550nm InGaAs/InP PIN photodetectors (PDs). ● Successfully developed a high-performance bulk acoustic wave (BAW) resonator. ● Established Taiwan subsidiary GCS Technology Co., Ltd. ● Successfully developed a low-loss millimeter-wave monolithic mixer diode.
2014	● Officially listed on the Over-the-Counter (OTC) market.

Year	History and Development
	● Successfully developed high-frequency and high-breakdown-strength 0.15μm GaN on SiC high-electron-mobility transistor (HEMT) technology.
2013	● Developed high-gain, high-efficiency, and high-linearity InGaP HBT for 802.11ac and 3G/4G mobile power amplifiers. ● Developed ultra-low-noise (Super Low Noise) E/D pHEMT for applications in WLAN, GPS, DBS, and VSAT receivers. ● Signed a GaN on SiC technology contract with a U.S.-based company, D. ● Successfully developed wide-tuning voltage-controlled oscillator (VCO) HBT technology. ● Achieved customer certification for SiC power electronic device manufacturing processes. ● Successfully developed high-voltage InGaP HBT P7 process technology for next-generation small cell base stations.
2012	Received HBT foundry orders from a leading international IDM company for satellite communication electronics.
2011	● Achieved certification for high-power RF GaN/Si components from a U.S.-based company. ● Successfully transferred multiple GaAs (HBT and pHEMT) technologies to a world-class silicon wafer foundry. ● Secured a GaN research and development project from a leading international IDM company. ● Renamed GCS.C to Global Communication Semiconductors, LLC.
2010	● Completed group restructuring with a share swap between GCS Holdings, Inc. and GCS.C, resulting in a capital stock of NT$306,946 thousand for GCS Holdings, Inc. ● Established GCS Holdings, Inc. as a group holding company in the Cayman Islands. ● Signed multiple GaAs (InGaP HBT and pHEMT) technology transfer agreements with a world-class silicon wafer foundry.
2008	Launched GaAs concentrator photovoltaic (CPV) solar cell wafer foundry services.
2004	Developed the world's fastest InP HBT technology (Ft > 300 GHz), suitable for 40-100G trans-impedance amplifiers (TIA) and high-speed test instrument ICs.
2003	Started mass production of 0.5-micron pHEMT RF switches.
2001	● Successfully developed an InGaAs PIN photodiode. ● Successfully developed InP HBT technology. ● Successfully developed high-voltage InGaP HBT technology.
2000	Successfully developed a GaAs PIN photodiode.
1999	Obtained ISO 9001:2000 certification.
1998	Successfully developed InGaP HBT technology.
1997	Established GCS.C and its manufacturing facility in Torrance, California, USA.

1.5 Policy Statement

In response to the global trend toward green and low-carbon sustainability, GCS Holdings, Inc. is actively fulfilling its corporate social responsibility by conducting organizational greenhouse gas (GHG) inventories to comprehensively monitor and manage its emissions. Based on the inventory results, the company further promotes GHG verification and voluntary reduction initiatives, demonstrating its commitment to climate change issues and minimizing the environmental impact of GHG emissions.

GCS Holdings, Inc. is committed to supporting global efforts to reduce greenhouse gas (GHG) emissions and aligning with government reduction targets while actively fulfilling its corporate social responsibility. The company ensures compliance with environmental regulations and customer requirements while fostering internal education programs to raise employee awareness of climate change. Employees are encouraged to take concrete actions, contributing collectively to environmental sustainability.

Chapter 2: Inventory Boundary Definition

2.1 Organizational Boundary Definition

This report defines the organizational boundary in accordance with the ISO 14064-1:2018 standard and the Greenhouse Gas (GHG) Protocol guidelines. The operational control approach is adopted, whereby 100% of GHG emissions from facilities under the company's management or operational control are accounted for. The scope of this inventory covers GCS Holdings, Inc., a Cayman Islands-registered company, whose organizational boundary includes its operational headquarters Global Communication Semiconductors, LLC (GCS) in California and its Taiwan-based subsidiary GCS Device Technologies Co., Ltd. (GDT). The following addresses represent the scope of this year's GHG inventory.

Table 2.1 Sites Included in the GHG Inventory

Organization Name	Organization Address
GCS Holdings, Inc.	**Global Communication Semiconductors, LLC (Operational Headquarters):** 23155 Kashiwa Court, Torrance, California 90505, USA
	GCS Device Technologies Co., Ltd. (Subsidiary) 7F-5, No. 738, Zhongzheng Road, Zhonghe District, New Taipei City, Taiwan

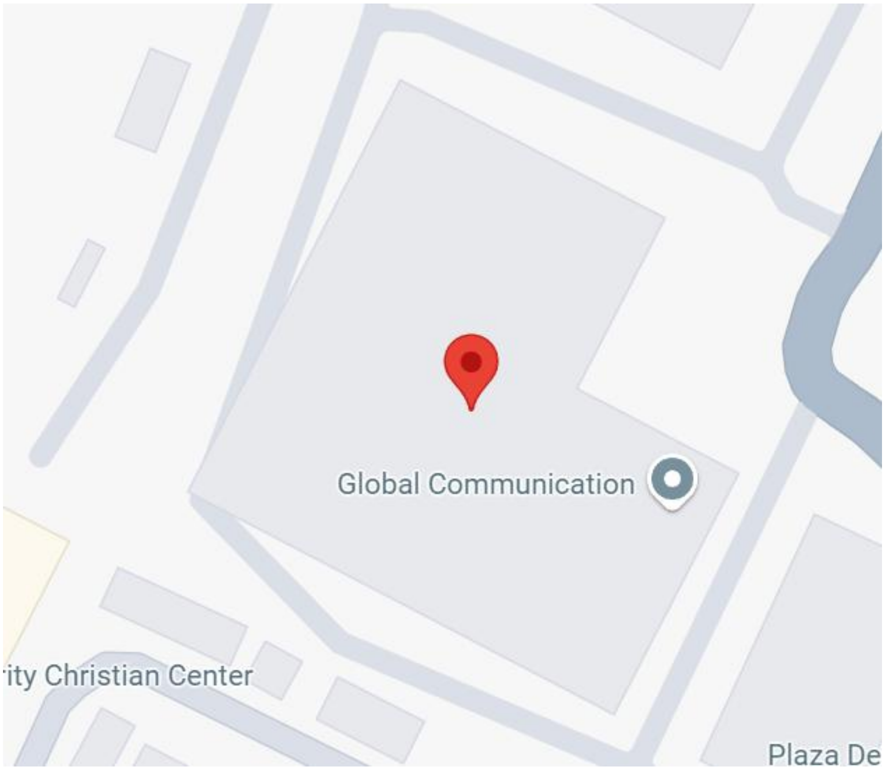

Figure 2.1 Global Communication Semiconductors, LLC (Operational Headquarters): Location Map

Figure 2.2 GCS Device Technologies Co., Ltd. (Subsidiary): Location Map

2.2 Report Boundary Definition

After establishing the organizational boundary for the greenhouse gas (GHG) inventory, the company further identifies all emission sources within the geographical boundary of the inventory to clearly define the reporting boundary. Emissions are categorized into direct and indirect sources, enabling users to effectively manage GHG-related risks and opportunities. If any emission sources are excluded within the defined boundary, the report will provide reasonable justification and supporting evidence.

2.2.1 Materiality Criteria for Indirect Emissions

A materiality threshold is established by quantifying these factors on a 0 to 5-point scale. Indirect emission sources are identified as material if the total score across these four principles meets or exceeds 11 points. Emission sources scoring above 11 points will be included in the reporting boundary disclosure and further classified for emission source identification.

Table 2.2 Materiality Scoring Principles for Indirect Emissions

Score	Emission Contribution Level	Potential for Reduction	Availability of Activity Data	Availability of Emission Factors
5	High proportion of total emissions	Short-term (1-3 years) reduction measures in place and effective	Measured data	Measured/calculated based on mass or energy balance
4	Medium-high proportion of total emissions	Short-term (1-3 years) reduction plan in place with reduction potential	Financial data from accounting systems	National emission factors
3	Moderate proportion of total emissions	Medium-term (3-5 years) reduction plan in place with reduction potential	Referencing publicly available calculation standards	Life cycle assessment (LCA) software factors
2	Low proportion of total emissions	Long-term (5-10 years) reduction plan in place with reduction potential	Estimated data based on research literature	International emission factors
1	Not cost-effective or technically feasible to quantify emissions	No reduction plan in place or improvement measures are difficult to implement	Data conversion is not cost-effective or data collection is time-consuming due to large volume	Environmentally extended input-output factors
0	Not applicable	Not applicable	Not applicable	Not applicable

Table 2.3 Materiality Assessment of Indirect Emissions

Category	Corresponding Activities/Facility Types	Materiality Assessment Principles (0–5 points)				Total Score	Materiality Status
		Emission Contribution Level	Potential for Reduction	Availability of Activity Data	Availability of Emission Factors		
Indirect GHG Emissions from Purchased Energy (Category 2)	Imported Electricity	**5**	**4**	**5**	**5**	**19**	**Yes**
	Imported Energy	0	0	0	0	0	No
Indirect GHG Emissions from	Upstream raw material transportation	2	2	1	4	9	No

Category	Corresponding Activities/Facility Types	Materiality Assessment Principles (0–5 points)				Total Score	Materiality Status
		Emission Contribution Level	Potential for Reduction	Availability of Activity Data	Availability of Emission Factors		
Transportation (Category 3)	and distribution						
	Downstream product transportation and distribution	2	2	1	4	9	No
	Employee commuting	1	1	4	4	10	No
	Customer and visitor transportation	2	1	1	3	7	No
	Business travel	1	1	3	3	8	No
	Waste disposal transportation	3	1	3	3	10	No
Indirect GHG Emissions from Organizational Product Use (Category 4)	**Purchased goods and services**	**2**	**1**	**4**	**4**	**11**	**Yes**
	Capital goods	3	1	1	1	6	No
	Waste generated from operations	2	1	4	3	10	No
	Upstream leased assets	2	1	1	1	5	No
	Emissions from service usage not specified above	0	0	0	0	0	No
Indirect GHG Emissions from Product Use (Category 5)	Use of sold products	3	2	1	2	8	No
	End-of-life treatment of sold products	3	2	1	2	8	No
	Downstream leased assets	0	0	0	0	0	No
	Investments	1	1	1	1	4	No
Other Indirect GHG Emissions (Category 6)	Other	0	0	0	0	0	No

2.2.2 Report Boundary

The identification of greenhouse gas (GHG) types follows the ISO 14064-1:2018 standard and the classifications recognized in the IPCC Sixth Assessment Report (AR6), covering the seven major GHGs: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), nitrogen trifluoride (NF_3), sulfur hexafluoride (SF_6), hydrofluorocarbons (HFCs), and perfluorocarbons (PFCs). In accordance with ISO 14064-1:2018, the organizational GHG disclosures are categorized into six classes: (1) Direct GHG emissions and removals, (2) Indirect GHG emissions from purchased energy, (3) Indirect GHG emissions from transportation, (4) Indirect GHG emissions from the use of organizational products, (5) Indirect GHG emissions from the use of sold products, and (6) Other indirect GHG emissions.

I. Direct GHG Emissions and Removals (Category 1)

Direct greenhouse gas (GHG) emissions refer to emissions from sources owned or controlled within the company's organizational boundary. These include stationary sources, such as GCS’s generators emitting CO_2, CH_4, and N_2O; fugitive emissions, including leakage from GCS’s equipment maintenance, junctions, and sealed components (CO_2), as well as CH_4 emissions from GDT’s septic systems; process emissions from GCS’s integrated circuit (IC) manufacturing, where gases used in chemical vapor deposition (CVD) and etching release CO_2, CH_4, HFCs, PFCs, N_2O, NF_3, and SF_6; and mobile sources, such as GHG emissions from GCS’s forklifts.

II. Indirect GHG Emissions from Imported Energy (Category 2)

Indirect emissions from purchased energy refer to GHG emissions associated with electricity sourced externally beyond the company's organizational boundary.

III. Indirect GHG Emissions from Transportation (Category 3)

This category includes indirect GHG emissions from fuel combustion in transportation equipment outside the company’s organizational boundary. It covers emissions from material transportation, personnel transportation, and all related modes of transport. If the transportation equipment is owned or controlled by the company, the emissions should be classified under Category 1 (Direct Emissions).

IV. Indirect GHG Emissions from Products Used by the Organization (Category 4)

This category accounts for indirect emissions related to the organization’s purchase of goods and services outside its boundary. These sources may be stationary or mobile and are associated with all types of goods purchased by the company. This inventory includes waste disposal and upstream procurement of purchased electricity, municipal water, diesel and propane.

V. Indirect GHG Emissions Associated with the Use of Products from the Organization (Category 5)

This category includes indirect GHG emissions generated from the use of the company’s sold products after the manufacturing phase. The emission scope varies depending on product lifecycle and end-user activities.

VI. Indirect GHG Emissions from Other Sources (Category 6)

This category accounts for any organization-specific emissions or removals that do not fall under the previous five categories, ensuring comprehensive reporting of all GHG sources.

2.3 Materiality Threshold

The materiality threshold for GCS Holdings, Inc.'s greenhouse gas (GHG) inventory is set at 3%. If changes in the reporting boundary, ownership and control, or quantification methods result in a total emissions variation exceeding 3%, the baseline year inventory will be adjusted accordingly to reflect the new conditions.

2.4 Base Year Establishment and Inventory Adjustments

2.4.1 Base Year Selection and Rationale

The base year for GCS Holdings, Inc.'s greenhouse gas (GHG) inventory is set as 2024, as it represents a year with reliable and verifiable data for organizational activities. The principles for selecting the base year are as follows:

1. The 2024 GHG verification results will serve as the base year.
2. If relevant domestic regulations are enacted in the future, the base year will be set in accordance with those regulations.
3. In the future, the base year will be determined based on the requirements of international reporting systems.

2.4.2 Base Year Adjustments

The base year will be adjusted according to the global warming potential (GWP) values for various greenhouse gases outlined in the IPCC 2021 Sixth Assessment Report. The base year will be reviewed annually, and adjustments will be made to the base year inventory if any of the following situations occur:

1. Changes to the reporting boundary or organizational structure (such as mergers, acquisitions, or spin-offs) that result in GHG emissions changes exceeding the materiality threshold of 3%.
2. Changes to calculation methods or emission factors that lead to GHG emissions changes exceeding the materiality threshold of 3%.

3. Discovery of a significant error, either individual or cumulative, that results in changes to the base year emissions exceeding the materiality threshold of 3%.
4. Any adjustments to the base year emissions will be retrospective, allowing the company to make special adjustments as necessary.

2.4.3 Base Year GHG Inventory

GCS Holdings, Inc. (GCS: 23155 Kashiwa Court, Torrance, California 90505, USA; GDT: 7F-5, No. 738, Zhongzheng Road, Zhonghe District, New Taipei City, Taiwan) will use the 2024 GHG inventory results as the base year emissions. The base year emissions inventory is presented in Table 2.4.

Table 2.4 Base Year GHG Emissions

Greenhouse Gas Emission Category		Carbon Emissions (Metric Tons CO_2e/Year)
Category 1	Direct GHG emissions and removals	7,572.5115
1.1	Direct emissions from stationary combustion	0.2969
1.2	Direct emissions from mobile combustion	0.2172
1.3	Direct process emissions and removals	7,571.6665
1.4	Direct fugitive emissions from the release of GHGs in anthropogenic systems	0.3308
1.5	Direct emissions and removals from land use, land use change and forestry (LULUCF)	0.0000
Category 2	Indirect GHG emissions from imported energy	1,622.5966
2.1	Indirect emissions from imported electricity	1,622.5966
2.2	Indirect emissions from imported energy (steam, heating, cooling, and compressed air)	0.000
Category 3	Indirect GHG emissions from transportation	Non-significant
3.1	Emissions from upstream transport and distribution for goods	Non-significant
3.2	Emissions from downstream transport and distribution for goods	Non-significant
3.3	Emissions from employee commuting	Non-significant
3.4	Emissions from client and visitor transport	Non-significant
3.5	Emissions from business travel	Non-significant
3.6	Emissions from waste transport and disposal	Non-significant
Category 4	Indirect GHG emissions from products used by the organization	475.3001
4.1	Emissions from purchased goods	475.3001

Greenhouse Gas Emission Category		Carbon Emissions (Metric Tons CO_2e/Year)
4.2	Emissions from capital goods	Non-significant
4.3	Emissions from disposal of solid and liquid waste	Non-significant
4.4	Emissions from use of assets (upstream leased assets)	Non-significant
4.5	Emissions from use of services that are not otherwise included	
Category 5	Indirect GHG emissions associated with the use of products from the organization	Non-significant
5.1	Emissions or removals from use stage of the product	Non-significant
5.2	Emissions from downstream leased assets	Non-significant
5.3	Emissions from end-of-life stage of the product	Non-significant
5.4	Emissions from investments	Non-significant
Category 6	Indirect GHG emissions from other sources	Non-significant
6.1	Indirect GHG emissions from other sources	Non-significant

Chapter 3: Greenhouse Gas Emissions

3.1 Emission Source Identification

The Category 1 direct greenhouse gas emissions of the company primarily originate from semiconductor etching and thin-film deposition processes, followed by fugitive emissions such as refrigerant leakage emissions and septic systems, and stationary sources from generators. The Category 2 emissions come entirely from purchased electricity. Category 4 emissions include upstream procurement (such as purchased electricity and municipal water). The reporting boundary and emission source identification are shown in Table 3.1.

Table 3.1 Greenhouse Gas Emission Source Identification

<table>
<tr><th>Category</th><th>Subcategory</th><th>Corresponding Activities/Facility Types</th><th>Emission Sources</th></tr>
<tr><td rowspan="6">Direct GHG Emissions and Removals (Category 1)</td><td>Stationary Sources</td><td>Generators</td><td>Diesel</td></tr>
<tr><td>Mobile Sources</td><td>Forklifts</td><td>Propane</td></tr>
<tr><td rowspan="2">Process Emissions</td><td>Etching Process</td><td>HFCs, PFCs, SF6</td></tr>
<tr><td>Thin-film Deposition Process</td><td>N_2O</td></tr>
<tr><td rowspan="2">Fugitive Emissions</td><td>Refrigerant leakage emissions</td><td>R-134A, R-407C</td></tr>
<tr><td>Septic Systems</td><td>CH_4</td></tr>
<tr><td>Indirect GHG Emissions from Purchased Energy (Category 2)</td><td>Greenhouse gas emissions generated from purchased electricity, heat, steam, or other fossil fuel-derived energy</td><td>Electricity-using equipment, processing equipment, motors, air conditioners, lighting, instruments, fire pumps</td><td>Purchased Electricity CO_2</td></tr>
<tr><td>Indirect GHG Emissions from the Use of Organizational Products (Category 4)</td><td>Purchased Goods and Services</td><td>Upstream Procurement</td><td>Municipal water, purchased electricity, diesel</td></tr>
</table>

Clarification Notes:

1. No biogenic CO_2 emissions or removals are reported under any of the company's greenhouse gas categories.
2. Refrigerant leakage emissions are calculated based on the actual refill amount.
3. The company did not purchase, fill, or use dry powder fire extinguishers, CO_2 fire extinguishers, or eco-friendly sea dragon fire extinguishers in 2025, and therefore, no greenhouse gas emissions were generated.

3.2 Total Greenhouse Gas Emissions

The total greenhouse gas emissions for GCS Holdings, Inc. in 2025 amounted to **9,011.405** metric tons CO_2e, of which Category 1 + Category 2 emissions accounted for **8,542.8601** metric tons CO_2e, and Category 4 emissions totaled **468.545** metric tons CO_2e. The majority of the emissions are from Category 1, representing **83.56%** of the total emissions from Category 1 + Category 2. The breakdown of emissions by category and the types of gases emitted are provided in Tables 3.2, 3.3, and 3.4.

Table 3.2 Greenhouse Gas Emissions by Category

Greenhouse Gas Emission Category		Carbon Emissions (Metric Tons CO_2e/Year)
Category 1	Direct GHG emissions and removals	7,138.6186
1.1	Direct emissions from stationary combustion	0.7452
1.2	Direct emissions from mobile combustion	0.4945
1.3	Direct process emissions and removals	6,904.5804
1.4	Direct fugitive emissions from the release of GHGs in anthropogenic systems	232.7985
1.5	Direct emissions and removals from land use, land use change and forestry (LULUCF)	0.0000
Category 2	Indirect GHG emissions from imported energy	1,404.2415
2.1	Indirect emissions from imported electricity	1,404.2415
2.2	Indirect emissions from imported energy (steam, heating, cooling, and compressed air)	0.0000
Category 3	Indirect GHG emissions from transportation	Non-significant
3.1	Emissions from upstream transport and distribution for goods	Non-significant
3.2	Emissions from downstream transport and distribution for goods	Non-significant
3.3	Emissions from employee commuting	Non-significant
3.4	Emissions from client and visitor transport	Non-significant
3.5	Emissions from business travel	Non-significant
3.6	Emissions from waste transport and disposal	Non-significant
Category 4	Indirect GHG emissions from products used by the organization	468.5449
4.1	Emissions from purchased goods	468.5449
4.2	Emissions from capital goods	Non-significant
4.3	Emissions from disposal of solid and liquid waste	Non-significant
4.4	Emissions from use of assets (upstream leased assets)	Non-significant

Greenhouse Gas Emission Category		Carbon Emissions (Metric Tons CO_2e/Year)
4.5	Emissions from use of services that are not otherwise included	Non-significant
Category 5	Indirect GHG emissions associated with the use of products from the organization	Non-significant
5.1	Emissions or removals from use stage of the product	Non-significant
5.2	Emissions from downstream leased assets	Non-significant
5.3	Emissions from end-of-life stage of the product	Non-significant
5.4	Emissions from investments	Non-significant
Category 6	Indirect GHG emissions from other sources	Non-significant
6.1	Indirect GHG emissions from other sources	Non-significant

Table 3.3 Category 1 + Category 2 Greenhouse Gas Emissions and Proportions

Category	Category 1	Category 2	Total (Category 1 + 2)
Greenhouse Gas Emissions (Metric Tons CO_2e/Year)	7,138.6186	1,404.2415	8,542.860
Emission Proportion (%)	83.56%	16.44%	100%

Table 3.4 Category 1 + Category 2 Greenhouse Gas Emissions by Type

Greenhouse Gas Type	CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	NF_3
Greenhouse Gas Emissions (Metric Tons CO_2e/Year)	1,400.6316	2.8881	17.1270	604.8394	4,676.8353	1,840.5387	0.0000
Proportion of Category 1 + 2 Emissions (%)	16.40%	0.03%	0.20%	7.08%	54.75%	21.54%	0.00%

3.3 Direct Greenhouse Gas Emissions (Category 1)

3.3.1 Emission Type Statistical Analysis

For GCS Holdings, Inc., process emissions have the highest proportion, accounting for **80.82%** of the total emissions from Category 1 + Category 2. The next highest is fugitive emissions, which account for **2.73%**. The statistical breakdown of emission types within Category 1 is shown in Table 3.5.

Table 3.5 Category 1 Greenhouse Gas Emission Type Breakdown

Category	Stationary Combustion	Mobile Combustion	Process Emissions	Fugitive Emissions
Greenhouse Gas Emissions (Metric Tons CO_2e/Year)	0.7452	0.4945	6,904.5804	232.7985
Proportion of Category 1 + 2 Emissions (%)	0.01%	0.01%	80.82%	2.73%

3.4 Energy Indirect Greenhouse Gas Emissions (Category 2)

In 2025, the total Category 2 greenhouse gas emissions for GCS Holdings, Inc. amounted to **1,404.2415** metric tons CO_2e. The majority of the energy indirect emissions came from the electricity purchased from California, which accounted for **16.44%** of the total emissions from Category 1 + Category 2.

3.5 Other Indirect Greenhouse Gas Emissions (Category 3–6)

Table 3.6 Category 3 Greenhouse Gas Emission Type Breakdown

Category	(3.1) Upstream Transportation and Distribution	(3.2) Downstream Transportation and Distribution	(3.3) Employee Commuting	(3.4) Customer and Visitor Transportation	(3.5) Business Travel	(3.6) Waste Transportation
Indirect GHG Emissions from Transportation (Category 3)	Non-significant	Non-significant	Non-significant	Non-significant	Non-significant	Non-significant

Table 3.7 Category 4 Greenhouse Gas Emission Type Breakdown

Category	(4.1) Purchased Goods and Services	(4.2) Capital Goods	(4.3) Waste Generated from Operations	(4.4) Upstream Leased Assets	(4.5) Emissions from Service Usage Not Specified Above
Indirect GHG Emissions from the Use of Organizational Products (Category 4)	468.5449 metric tons CO_2e	Non-significant	Non-significant	Non-significant	Non-significant

Table 3.8 Category 5 to Category 6 Greenhouse Gas Emission Type Breakdown

Category	(5.1) Use of Sold Products	(5.2) Downstream Leased Assets	(5.3) End-of-Life Treatment of Sold Products	(5.4) Investments	(6.1) Other
Indirect GHG Emissions from the Use of Sold Products (Category 5) & Other Indirect Emissions (Category 6)	Non-significant	Non-significant	Non-significant	Non-significant	Non-significant

Chapter 4: Data Quality Management

4.1 Activity Data Collection Methods

The activity data and related supporting documents for greenhouse gas emission sources are collected through established data filing systems. The data collection methods and sources have been reviewed and confirmed by the relevant departments and are stored and managed in a unified manner. The data collection methods for each emission source and their supporting documentation are shown in Table 4.1.

Table 4.1 Activity Data Collection Methods and Supporting Documentation

Emission Source	Data Source	Statistical/Estimation Method
Generators	Diesel level gauge	Compiled and summarized by the inventory team
Forklifts	Propane procurement records	Compiled and summarized by the inventory team
Process Emissions	Tool logs	Compiled and summarized by the inventory team
Refrigerant leakage emissions	Refrigerant refill records	Compiled and summarized by the inventory team
Methane (Septic Systems)	HR system	Compiled and summarized by the inventory team
Electricity (Purchased Electricity)	Electricity bills	Summed electricity consumption from January to December as listed on the bill. If January and December have overlapping consumption from previous or following months, the monthly average is adjusted to cover the period from January 1st to December 31st.
Purchased Goods and Services (Water)	Water bills	Compiled and summarized by the inventory team
Purchased Goods and Services (Purchased Electricity)	Electricity bills	Compiled and summarized by the inventory team
Purchased Goods and Services (Diesel)	Diesel level gauge	Compiled and summarized by the inventory team
Purchased Goods and Services (Propane)	Procurement records	Compiled and summarized by the inventory team

4.2 Greenhouse Gas Quantification Methods

4.2.1 Quantification Principles

1. Greenhouse gas emissions are calculated primarily using the Emission Factor Method. For Categories 1 and 2, emission factors are drawn principally from the *GHG Emission Factors Table* published by Taiwan Ministry of Environment on February 5, 2024, the grid electricity emission factor issued by Taiwan Bureau of Energy, and the *U.S. EPA 2025 GHG Emission Factors Hub*. Process emissions are calculated in accordance with the *2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories* (Volume 3, Table 6.11, Tier 2c), with adjustments applied for local scrubber (LS) removal efficiency. For Categories 3 through 6, calculations rely on life cycle assessment (LCA) emission factors obtained from sources including the Ministry of Environment's Product Carbon Footprint Information Network, *Country Specific Electricity Grid Greenhouse Gas Emission Factors – 2025*, and *Operational Carbon Footprint of the U.S. Water Sector*.
2. Emissions from various greenhouse gases are converted to weight or volume units such as metric tons or cubic meters, depending on the source.
3. After calculating the emissions from each source, the global warming potential (GWP) values from the *2021 IPCC Sixth Assessment Report* are used for each type of greenhouse gas. All results are then converted to carbon dioxide equivalent values (CO_2e), measured in metric tons CO_2e/year.

4.2.2 Calculation Methods

1. Stationary Emission Source: Generators

   The greenhouse gas emissions from diesel are calculated as follows:

   Diesel GHG emissions = Diesel consumption × [CO_2 emission factor × CO_2 global warming potential (GWP) + CH_4 emission factor × CH_4 GWP + N_2O emission factor × N_2O GWP]
2. Mobile Emission Source: Forklifts

   Propane GHG emissions = Propane consumption × [CO_2 emission factor × CO_2 global warming potential (GWP) + CH_4 emission factor × CH_4 GWP + N_2O emission factor ×

N_2O GWP]

3. Process Emission Source:

Greenhouse gas emissions from gases used in processes are calculated in accordance with the *2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories* (Volume 3, Table 6.11, Tier 2c). The calculation for unreacted emissions is as follows:

Unreacted emissions calculation formula:

$$E_i = \sum_p [C_{i,p} \cdot (1 - U_{i,p}) \cdot (1 - D_{i,p})]$$

In this formula， E_i represents the emissions of gas *i* (in kilograms), $C_{i,p}$ represents the consumption of gas i in process *p* (in kilograms),、 $U_{i,p}$represents the utilization rate of gas *i* in process *p* (in percentage, with preset parameters as shown in Table 7), $D_{i,p}$represents the total emission reduction rate of gas *i* in process *p* (in percentage).

$$D_{i,p} = a_{i,p} \cdot d_i \cdot UT_p$$

In this formula, $a_{i,p}$ represents the emission proportion of gas *i* that is controlled by the appropriate emission control technology for equipment in process *p* (in percentage), d_i represents the reduction rate of gas *i* by the emission control technology in process equipment (in percentage), which is the Destruction and Removal Efficiency (DRE) (preset parameter, as shown in Table 8), and UT_p represents the average proportion of normal operation for the control technology in process *p*.

$$a_{i,p} = \frac{n_{i,p,a}}{n_{i,p}}$$

In this formula, $na_{i,p,a}$ represents the number of equipment in process *p* that is equipped with appropriate emission control technology for gas *i*, and $n_{i,p}$ represents the total number of equipment in process *p* that uses gas *i*.

$$UT_p = 1 - \frac{\sum_n Td_{n,p}}{\sum_n TT_{n,p}}$$

In this formula, $Td_{n,p}$ represents the total time (in minutes) during the entire year when the emission control technology *n* on equipment in process was not operating, and $TT_{n,p}$ represents the total time (in minutes) during the entire year when the emission control technology n on equipment in process was operating.

When NF_3 or F_2 is used as an input gas in the RPC process, and a hydrocarbon combustion emission control technology is applied, hydrocarbons and F_2 (including the F_2 produced from the decomposition of NF_3 in the RPC process) may directly react, potentially forming CF_4. The following equation should be considered in this scenario:

$$EAB_{i,CF_4} = \sum_p C_{i,p} (1 - U_{i,p})(1 - \eta_p) AB_{i,CF_4}$$

In this context, EAB_{i,CF_4} refers to the CF_4 emissions produced by the hydrocarbon combustion emission control system when the equipment manufacturer has not proven that hydrocarbons will not react directly with fluorides. $C_{i,p}$ represents the consumption of gas i in process p (in kilograms), specifically the NF_3 or F_2 used in the RPC process. $U_{i,p}$is the utilization rate of gas i in process p (in percentage) (preset parameter, as shown in Table 7). η_p refers to the ratio of emission control systems connected to process p that are certified not to form CF_4 to the total number of emission control systems connected to process p at the facility. AB_{i,CF_4} represents the emission factor: if the equipment supplier can prove that the conversion rate from F_2 to CF_4 or from NF_3 to CF_4 is less than 0.1%, then AB_{i,CF_4} is set to zero; otherwise, the default values of $AB_{NF3,\ CF4}$ = 0.093 or $AB_{F2,\ CF4}$ = 0.116 should be used.

The calculation formula for the emissions from the conversion of the input gas into byproducts is as follows:

$$BPE_k = \sum_i [\sum_p [C_{i,p} \cdot B_{k,i,p} \cdot (1 - D_{k,p})]]$$

In this context,， BPE_k represents the emissions from the conversion of gas i into byproduct k (in kilograms),、 $C_{i,p}$ represents the consumption of gas i in process p (in kilograms),$B_{k,i,p}$ represents the emission factor for the conversion of gas i into byproduct k in process p(in percentage) (preset parameter, as shown in Table 7), $D_{k,p}$ represents the total emission reduction rate for byproduct k in process p(in percentage).

$$D_{k,p} = a_{k,p} \cdot d_k \cdot UT_p$$

In this formula, $a_{k,p}$represents the emission proportion of gas k controlled by appropriate emission control technology for equipment in process p (in percentage), d_k

represents the reduction rate of gas k by the emission control technology in process p (in percentage), which is the Destruction and Removal Efficiency (DRE) (preset parameter, as shown in Table 8), and UT_p represents the average proportion of normal operation for the control technology in process p.

$$a_{k,p} = \sum_{i} \frac{n_{k,p,a}}{n_{k,p}}$$

In this formula, $na_{k,p,a}$ represents the number of equipment in process p that is equipped with appropriate emission control technology for gas k, and $n_{k,p}$ represents the total number of equipment in process p that generates gas k.

Based on the usage of fluorinated gases, the company calculates the emissions using the aforementioned formula, considering the emission source parameters, emission factors, related parameters, and local scrubber removal efficiency values from the table below. The calculated emissions are as follows: N_2O emissions amount to 14.5012 metric tons CO_2e, PFCs emissions amount to 4,676.8353 metric tons CO_2e, HFCs emissions amount to 372.7051 metric tons CO_2e, NF_3 emissions amount to 0.0000 metric tons CO_2e, and SF_6 emissions amount to 1,840.5387 metric tons CO_2e.

4. Refrigerant Greenhouse Gas Emissions = Actual refrigerant recharge × Emission factor × GWP value
5. Methane Emissions (Septic Systems)

   The methane emissions (septic systems) greenhouse gas emissions are calculated as:

   Methane emissions = Number of employees × Corresponding workdays and hours × CH_4 emission factor × CH_4 global warming potential (GWP)
6. Purchased Electricity

   The purchased electricity greenhouse gas emissions are calculated as:

   Purchased electricity emissions = Electricity consumption × CO_2 emission factor × CO_2 global warming potential (GWP)

   - For GDT, the purchased electricity emission factor is calculated using the Bureau of Energy's 2024 electricity carbon emission factor of **0.474 kg CO_2e/kWh**.
   - For GCS, the purchased electricity emission factor is sourced from the *U.S. EPA 2025 GHG Emission Factors Hub* (**eGRID Subregion WECC California**): **436.7 (lb CO_2**

/ MWh), **0.025 (lb CH_4 / MWh),**and **0.003 (lb N_2O / MWh)**.

7. Purchased Goods and Services (Municipal Water)

   The municipal water greenhouse gas emissions are calculated as:

   Municipal water emissions = Water consumption × CO_2 emission factor × CO_2 global warming potential (GWP)

8. Purchased Goods and Services (Purchased Electricity)

   The purchased electricity greenhouse gas emissions are calculated as:

   Purchased electricity emissions = Electricity consumption × CO_2 emission factor × CO_2 global warming potential (GWP)

9. Purchased Goods and Services (Diesel)

   The diesel greenhouse gas emissions are calculated as:

   Diesel emissions = Diesel consumption × CO_2 emission factor × CO_2 global warming potential (GWP)

10. Purchased Goods and Services (Propane)

    The propane greenhouse gas emissions are calculated as:

    Propane emissions = Propane consumption × CO_2 emission factor × CO_2 global warming potential (GWP)

4.2.3 Emission Factor Management

The company's principles for selecting emission factors prioritize the use of measured or mass balance-derived factors first. If these are unavailable, national emission factors are used. If no applicable emission factors are found, the company will use internationally published applicable factors.

Table 4.2 Greenhouse Gas Emission Factors

Category	Emission Source	Emission Factor Source	Name	GHG Emission Factor		Unit
Stationary Combustion	Diesel	US EPA 2025 GHG Emission Factors Hub	Distillate Fuel Oil No. 2	CO_2	2.6971979257	tCO_2/m^3
				CH_4	0.0001083106	tCH_4/m^3
				N_2O	0.0000211338	tN_2O/m^3

		UK Government GHG Conversion Factors for Company Reporting - WTT Fuels	Diesel (100% mineral diesel)	CO_2	0.6240900000	tCO_2/m^3
Fugitive Emissions	CH_4	GHG Emission Factors Table (Feb 5, 2024)	Methane Emission Factor	CH_4	0.0029760000	tCH_4/person-year
Purchased Electricity (Taiwan)	Purchased Electricity	Taiwan 2024 Electricity Emission Factor	Taiwan 2024 Electricity Emission Factor	CO_2	0.4740000000	tCO_2/MWh
Indirect Emissions – Purchased Goods and Services	Purchased Electricity – Indirect Emissions (California)	Country Specific Electricity Grid Greenhouse Gas Emission Factors - 2024	Estimated WTT Factor (2024)	CO_2	0.0654693546	tCO_2/MWh
Indirect Emissions – Purchased Goods and Services	Purchased Electricity – Indirect Emissions (Taiwan)	Taiwan Product Carbon Footprint Information Network	Indirect Electricity Carbon Footprint (2021)	CO_2	0.0973000000	tCO_2/MWh
Indirect Emissions – Purchased Goods and Services	Municipal Water – Indirect Emissions (California)	Operational Carbon Footprint of the U.S. Water Sector	Upstream Emission Factor for Water Procurement	CO_2	0.4630000000	tCO_2/dam^3
Indirect Emissions – Purchased Goods and Services	Municipal Water – Indirect Emissions (Taiwan)	Taiwan Product Carbon Footprint Information Network	Municipal Water (2020)	CO_2	0.2330000000	tCO_2/dam^3
Purchased Electricity (California)	Purchased Electricity	US EPA 2025 GHG Emission Factors Hub	eGRID Subregion WECC California	CO_2	0.19806321476	tCO_2/MWh
				CH_4	0.0000113398	t CH_4/MWh
				N_2O	0.000001360776	tN_2O/MWh
Mobile Combustion	Propane	US EPA 2025 GHG Emission Factors Hub	Liquefied Petroleum Gases (LPG)	CO_2	2.9598749349	tCO_2/ton
				CH_4	0.0002397082	tCH_4/ton
Indirect				N_2O	0.0003439291	tN_2O

Emissions – Purchased Goods and Services						/ton
		UK Government GHG Conversion Factors for Company Reporting - WTT Fuels	Propane	CO_2	0.3526701800	tCO_2/ton
Fugitive Emissions	WD40 Lubricant 473ml	Product Label	Product Label	CO_2	0.0000097001	tCO_2/bottle
Fugitive Emissions	R-134A	IPCC 2021	HFC-134a/R-134a, 1,1,1,2-Tetrafluoroethane, C2H2F4	HFCs	1.0000000000	tCO_2/ton
Fugitive Emissions	R-407C	IPCC 2021	R-407C, HFC-32/HFC-125/HFC-134a (23.0/25.0/52.0)	HFCs	1.0000000000	tCO_2/ton

4.2.4 Global Warming Potential (GWP)

The greenhouse gases assessed in the company's inventory use the GWP values listed in the IPCC 2021 Sixth Assessment Report. These include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), nitrogen trifluoride (NF_3), sulfur hexafluoride (SF_6), hydrofluorocarbons (HFCs), and perfluorocarbons (PFCs).

Table 4.3 Summary of Global Warming Potential (GWP) Values

Greenhouse Gas Type	GWP Value	Data Source
CO_2	1	IPCC 2021 Sixth Assessment Report GWP Values
CH_4	27.9	
N_2O	273	
HFCs(R-134A)	1,530	
HFCs(R-407C)	1,908	

4.3 Greenhouse Gas Data Quality Management

4.3.1 Data Quality Quantification Method

For the 2025 greenhouse gas data quality management, the company primarily uses the activity data error level (A1), data credibility level (A2), and emission factor error level (A3) to evaluate error levels and assign scores. These scores serve as a reference for improving the quality management of greenhouse gas data. The Greenhouse Gas Data Quality Error Level Scoring Table is shown in Table 4.4.

The inventory data error level is calculated as:

Inventory Data Error Level = Activity Data Error Level (A1) × Data Credibility Level (A2) × Emission Factor Error Level (A3).

Table 4.4 Greenhouse Gas Data Quality Management Error Level Scoring Table

Scoring / Item	1 Point	2 Points	3 Points
Activity Data Error Level (A1)	Activity data is automatically continuously measured (a)	Activity data is measured intermittently (b)	Activity data is self-estimated (c)
Data Credibility Level (A2)	External calibration or multiple data sets as evidence (1)	Internal calibration or proof through accounting certification (2)	No instrument calibration or data compilation (3)
Emission Factor Error Level (A3)	Uses (1) measurement/energy balance-derived factors or (2) experience factors from the same process/equipment	Uses (3) manufacturer-provided factors or (4) regional emission factors	Uses (5) national emission factors or (6) international emission factors

4.3.2 Data Quality Management Error Level Scoring Results

For 2025 greenhouse gas data quality management, the company assessed the error levels of the emissions data for Category 1, Category 2, Category 3, and Category 4 emission sources. The error level scoring results for the emission sources are shown in Table 4.5.

The error level scores of the data were mostly concentrated in Level 3, and after weighting the greenhouse gas emissions data for each emission source, the average total data error level score was calculated to be **10.31**, which corresponds to Level 2 data quality. This indicates that the inventory data has a high degree of credibility.

Table 4.5 Greenhouse Gas Emission Source Data Error Level Scoring Results Summary

Data Level	Level 1	Level 2	Level 3	Total
Error Level Score	X < 10 pts	10 ≦ X < 19 pts	19 ≦ X ≦ 27 pts	
Average Total Error Level Score			Data Quality	

10.31	Level 2 (B-level)

4.3.3 Data Quality of Direct and Indirect Greenhouse Gas Emission Source Data

The quality control operations for the inventory data are aligned with the principles of Relevance, Completeness, Consistency, Transparency, and Accuracy outlined in the Greenhouse Gas Inventory Management Procedures. The procedures are described as follows:

1. After completing the inventory for the previous year, the executive secretary shall perform general and specific quality audits to facilitate subsequent internal verification processes.
2. General Quality Audits: These audits focus on common errors that may occur during data collection, entry, processing, data filing, and emission measurement, which could lead to potential mistakes. A thorough and appropriate quality check is conducted, as shown in Table 4.6.
3. Specific Quality Audits: These audits address specific areas, such as the appropriateness of the reporting boundary, recalculation processes, the quality of input data for specific emission sources, and qualitative explanations of the main reasons for data uncertainty. A more rigorous audit is conducted for these areas, as shown in Table 4.7.

Table 4.6 General Quality Audit Process Content

Inventory Stage	Task Content
Data Collection, Entry, and Processing	1. Check if data entry has errors. 2. Check the completeness of the entries or missing information. 3. Ensure that the appropriate version of electronic file control has been implemented.
Data Filing	1. Confirm the data sources for all primary data (including reference data) in the forms. 2. Check if all referenced literature has been filed. 3. Check if the assumptions and criteria used for the following items are documented: boundary, baseline year, methods, operational data, emission factors, and other parameters.

Emission Calculation and Calculation Check	1. Check if emission units, parameters, and conversion factors are appropriately labeled. 2. Check if units are appropriately labeled and correctly used in the calculation process. 3. Check the conversion factors. 4. Check the data processing steps in the table. 5. Check if input data and calculated data are clearly distinguished in the table. 6. Check representative samples of calculations using simple methods. 7. Check consistency between input data and calculations across different time periods and series.

Table 4.7 Specific Quality Audit Process Content

Inventory Type	Key Tasks
Emission Factors and Other Parameters	1. Ensure proper citation of emission factors and other parameters. 2. Check if the units of coefficients or parameters match those of the activity data. 3. Ensure that unit conversion factors are correct.
Activity Data	1. Ensure continuity of the data collection process. 2. Check if historical data exhibits consistent trends. 3. Perform cross-checking of activity data between similar facilities/departments. 4. Check if activity data changes with the recalculation of the baseline year.
Emission Calculation	1. Ensure that the emission calculation formulas in the software are correct. 2. Check if historical emission estimates are consistent. 3. Perform cross-checking of emissions between similar facilities/departments. 4. Compare the difference between actual measured values and estimated emission values.

4.4 Uncertainty Analysis

The uncertainty analysis for this inventory was conducted based on the IPCC-recommended uncertainty assessment methods for Category 1 and Category 2. Since Categories 3 to 6 involve life cycle categories, life cycle assessment (LCA) uncertainty methods were applied.

4.4.1 Uncertainty Quantification Method

The uncertainty quantification primarily uses the "error propagation method" to sum uncertainties, including the uncertainties of activity data and emission factors for major emission sources. This is evaluated based on the weighted proportion of emissions. The uncertainty calculation formulas are shown below (Formulas 1 and 2). The uncertainty ranges for activity data and emission factors are referenced from the IPCC recommended values (Tables 4.8 and 4.9). The commonly used uncertainty evaluation accuracy levels are shown in Table 4.10.

Uncertainty of a Single Emission Source (±%) (Formula 1)

Uncertainty of a Single Emission Source (±%) = ±【Activity Data Uncertainty ^{2} + Emission Factor Uncertainty ^{2}】$^{0.5}$

Total Uncertainty (±%) (Formula 1)

Total Uncertainty (±%) = ±【Σ(Emission of a Single Source×Uncertainty of a Single Emission Source)^2】$^{0.5}$÷Total Emission

Table 4.8 IPCC 2006 Recommended Activity Data Uncertainty Factors

Data Source	Fully Established and Comprehensive Data Statistics System		Not Fully Established Data Statistics System	
	Measurement	Inference	Measurement	Inference
Energy Industry	less than 1%	3-5%	1-2%	5-10%
Commercial, Residential (Fuel Consumption)	3-5%	5-10%	10-15%	15-25%
Industrial Combustion (Energy-intensive Industries)	2-3%	3-5%	2-3%	5-10%
Other Industries	3-5%	5-10%	10-15%	15-20%
Biomass Fuels (Data Sources Lack)	10-30%	20-40%	30-60%	60-100%

Table 4.9 IPCC Recommended Uncertainty for Activity Data and Emission Factors

Greenhouse Gas	Source Category	Emission Factor	Activity Data	Overall Uncertainty
CO_2	Energy	7%	7%	10%
CO_2	Industrial Processes	7%	7%	10%
CO_2	Land Use Change and Afforestation	33%	50%	60%
CH_4	Biomass Combustion	50%	50%	100%
CH_4	Oil and Gas Extraction Activities	55%	20%	60%
CH_4	Coal Mining and Handling Activities	55%	20%	60%
CH_4	Rice Cultivation	3/4	1/4	1
CH_4	Waste	2/3	1/3	1
CH_4	Livestock	25	10	25

Greenhouse Gas	Source Category	Emission Factor	Activity Data	Overall Uncertainty
CH_4	Livestock Waste	25	10	20
N_2O	Industrial Processes	35	35	50
N_2O	Agricultural Soils	-	-	2-tier variability
N_2O	Biomass Combustion	-	-	100%

Table 4.10 Uncertainty Assessment Accuracy Levels

Accuracy Level	Uncertainty of Sample Mean (95% Confidence Interval)
High	± 5%
Good	± 15%
Average	± 30%
Poor	Greater than 30%

4.4.2 Uncertainty Quantification Results

The company's greenhouse gas uncertainty quantification method uses activity data, emission factors, and weighted emission ratios for calculation. The results of the greenhouse gas inventory uncertainty assessment are shown in Table 4.11.

Activity Data: Verified against the electricity meter calibration technical specifications (for purchased electricity).

Emission Factor: IPCC guideline (for purchased electricity).

Based on the quantification results, the company's 2025 greenhouse gas inventory data is considered to have a high degree of credibility. Moving forward, the company will use these results as a reference for future greenhouse gas data quality management and will strive to reduce uncertainty values.

Table 4.11 Category 1 + Category 2 Uncertainty Assessment Results

Category 1 + Category 2 Uncertainty Quantification Value as a Percentage of Emissions (%)	Uncertainty 95% Confidence Interval	
	Lower	Upper
16.45%	- 7.0%	+ 7.0%

Chapter 5: Verification

In order to comply with the international ISO 14064-1:2018 standard and enhance the credibility and quality of the company's greenhouse gas inventory information and reporting, internal verification was conducted for the 2025 inventory results.

5.1 Verification Activities

1. Internal Verification Scope:

   All emission sources within the organizational boundary of GCS Holdings, Inc. (GCS: 23155 Kashiwa Court, Torrance, California 90505, USA; GDT: 7th Floor, No. 738, Zhongzheng Road, Zhonghe District, New Taipei City).

2. Verification Principles Followed:

   ISO 14064-1:2018 / ISO 14064-3:2019

3. Materiality Threshold:

   The materiality threshold for the company's greenhouse gas inventory is set at 5%

4. Verifier Competence and Qualifications:

   The internal verification for the company's 2025 inventory was conducted by the greenhouse gas internal verification team. All verification personnel involved in the internal verification have participated in greenhouse gas internal training courses.

5.2 Internal Verification

The company completed the 2025 greenhouse gas inventory internal verification in April 2026. This internal verification process aimed to implement corrective and improvement actions to enhance the quality of the greenhouse gas inventory and data, and to ensure the accuracy and consistency of the documentation and inventory report.

5.3 External Verification

After completing the internal verification, the company commissioned Crowe (TW) CPAs to perform the external verification. For Category 1, Category 2, and Category 4 the verification was conducted with a limited assurance level. The verification statement was obtained to enhance the credibility of the company's greenhouse gas inventory data.

Chapter 6: Report Management

1. The coverage period of this report is from January 1, 2025, to December 31, 2025.
2. The frequency of report preparation is once per year.
3. This report is primarily based on ISO 14064-1:2018 / ISO 14064-3:2019.
4. Report Issuance and Custody
   - This report is for internal use only within the company.
   - The report is provided for internal greenhouse gas management.
   - The report becomes effective upon issuance and remains valid until it is amended or discontinued.
5. Report Manager Information
   - Company Name: GCS Holdings, Inc.
   - Manager： Minkar Chen
   - Department： ESG and Technical Support
   - Address： 23155 Kashiwa Ct., Torrance CA 90505
   - Phone Number： 310-530-7274 ext. 176
   - Email： mkchen@gcssemi.com

Chapter 7: References

This report is based on the following documents:

1. 2006 IPCC Guidelines for National Greenhouse Gas Inventories
2. 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories
3. Environmental Protection Administration, Greenhouse Gas Emissions Inventory Guidelines 113th Year
4. ISO 14064-1:2018 Organization-level Greenhouse Gas Emission and Removal Quantification and Reporting Guidelines
5. ISO 14064-3:2019 Greenhouse Gas Claims Verification and Validation Guidelines
6. Taiwan Ministry of Environment GHG Emission Factors Table (February 5, 2024)
7. Greenhouse Gas Inventory Registration Form 3.0.0 (Revised)
8. United Nations Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report, 2021
9. US EPA 2025 GHG Emission Factors Hub
10. UK Government GHG Conversion Factors for Company Reporting
11. Taiwan Product Carbon Footprint Information Network
   https://cfp-calculate.tw/cfpc/WebPage/LoginPage.aspx