

# VERIFICATION REPORT

## Organization verified

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WaferTech, LLC  
5509 NW Parker Street, Camas WA 98607-8557

Bryan Mirick, Environmental Engineer  
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## Subject

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AWM has verified the GHG emissions in the responsible party's GHG statement for the period of Jan 1, 2022 to Dec 31, 2022 , which comprise the following:

- Scope 1 direct emissions
  - process
  - stationary equipment
- Scope 2 - electricity
- RECs for electricity
- Carbon offsets for Scope 1

## Responsibilities of the client

The responsible party is responsible for the preparation and fair presentation of the GHG statement in accordance with the criteria specified in this report. This includes designing, implementing and maintaining a data management system relevant to the preparation and fair presentation of a GHG statement that is free from material misstatement.

## Responsibilities of AWM

AWM's responsibility is to express an opinion on the GHG inventory based on our verification. AWM conducted our verification in accordance with ISO 14064-3. This requires that we comply with ethical requirements and plan and perform the verification to obtain the agreed upon level-of-assurance that the GHG emissions in the GHG statement are free from material misstatement.

## Evidence-gathering procedures

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### Results of the risk assessment

#### *Strategic analysis*

AWM did not identify any material risk from items such as the verification sector, scope of the client and the verification, or significant changes in the client.

#### *Risk assessment*

AWM did not identify any material risk to the objectives of this verification as a result of the client's GHG management system or data collection systems.

#### *Site visit requirements*



No site visit was required.

**Description of the verification work**

Per the results of the risk analysis, AWM conducted a recalculation of a sampling of WaferTech’s RY2022 inventory based upon invoice records and gas usage records. The results of this recalculation are as follows:

**Scope 1**

Activity	Client Report	AWM Calc	Difference	% Diff	% Material	Sample %
C2F6						
C4F8						
CF4	22,486.3	20,986.7	1,499.6	6.7%	1.5%	22.8%
CH2F2						
CHF3	11,415.2	11,485.6	-70.4	-0.6%	-0.1%	11.6%
N2O						
NF3						
C5F8						
SF6	14,620.8	14,738.7	-117.9	-0.8%	-0.1%	14.8%
CH3F						
HTF						
Stationary Natural Gas	14,249.0	14,983	-734.1	-5.2%	-0.7%	14.4%
Stationary Diesel						
<b>TOTAL</b>			<b>577.2</b>		<b>0.6%</b>	<b>63.7%</b>

Normalized:	0.9%	100.0%
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**Scope 2**

Activity	Client Report	AWM Calc	Difference	% Diff	% Material	Sample %
Indirect Electricity	45,870.3	45,874.7	-4.5	0.0%	0.0%	100.0%
<b>TOTAL</b>			<b>-4.5</b>		<b>0.0%</b>	<b>100.0%</b>

Normalized:	0.0%	100.0%
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**RECs / Offsets**

Activity	Client Report	Notes	Sample %
Carbon Offsets	109,784.0	Offsets retired exceed the Client Scope 1 emissions.	111.3%
RECs	47,139.2	RECs purchased exceed the Client Scope 2 emissions.	102.8%

Based upon the percent sampled, low normalized percent material difference, varied emissions types, and site visit experience no additional sampling was determined to be required.

**Verification opinion**

AWM has determined that the client’s emissions report(s) for the year of 2022 may be **Verified without qualifications**.

Discrepancies found during this verification total less than the materiality threshold of 5% each for Scope 1, Scope 2, RECs, and Offsets.

**Verification body**

Advanced Waste Management Systems, Inc. (AWMS)  
6430 Hixson Pike, Hixson, TN 37343  
(423) 843-2206

**Verification team**

Lead Verifier Rob Ellis  
Independent Peer Reviewer Richard Ellis

**Summary GHG statement**

Emission type	MT CO2e
Scope 1	98,610.9
Scope 2	45,870.3
RECs	45,870.3
Offsets	98,611.0

Reference: A-RMS-02-03-013, Version 17

**Verification criteria**

Criteria for this verification was:

- a) ISO 14064-1 (Second edition, 2018-12)
- b) the client’s GHG management system

This verification was performed to a Limited level-of-assurance.

**Verification scope**

Boundaries (ISO 14043-3:2019, 5.1.6.a): WaferTech is a wholly owned subsidiary of Taiwan Semiconductor (TSMC) located at 5509 Parker St. Camas, WA. Operational boundaries are the property boundaries and include the onsite Linde Gas Yard.

Facilities, physical infrastructure, activities, technologies, and processes (ISO 14043-3:2019, 5.1.6.b): WaferTech manufactures integrated circuits (ICs) for customers. No research or design is performed at this facility.

GHG sinks, sources, and reservoirs (ISO 14043-3:2019, 5.1.6.c): Fluorinated GHGs and N2O purchased for the semiconductor manufacturing production process.

Types of GHGs (ISO 14043-3:2019, 5.1.6.d): CO2, CH4, N2O, HFCs, PFCs, SF6.

Time period (ISO 14043-3:2019, 5.1.6.e): 2022.

Baseline (ISO 14043-3:2019, 5.1.6): None.



**Approvals**

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AWM Lead Auditor

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Date

## Appendix A: Conformance with Protocols

### 5 GHG inventory boundaries

5.1 Organizational boundaries	NC	Rob Ellis
The organization shall define its organizational boundaries.		WaferTech has defined its organizational boundaries within Section 6.4 of the FAB11 GREENHOUSE GAS MANAGEMENT PLAN C.I. (A-RMS-02-03-013, Version 17).
The organization may comprise one or more facilities. Facility-level GHG emissions or removals may be produced from one or more GHG sources or sinks.		WaferTech reports as a single facility with multiple GHG sources within the site boundary.
The organization shall consolidate its facility-level GHG emissions and removals by one of the following approaches:		n/a
<p>control: the organization accounts for all GHG emissions and/or removals from facilities over which it has financial or operational</p> <p>a) control;</p>		WaferTech consolidates its facility-level GHG emissions by the control approach.
<p>equity share: the organization accounts for its portion of GHG emissions and/or removals</p> <p>b) from respective facilities.</p>		n/a
The consolidation approach shall be consistent with the intended use of the GHG inventory.		Use of the control approach is consistent with the use of the inventory (emissions the site is responsible for).
The organization may use different consolidation approaches in the case of multiple reporting goals and requirements defined, for example, by the GHG programme, legal contract or different types of intended users.		WaferTech is not using different control approaches.
When a facility is owned or controlled by several organizations, these organizations should adopt the same consolidation approach for that facility. The organization shall document and report which consolidation approach it applies.		WaferTech is wholly owned by TSMC.
8	0	8

5.2 Reporting boundaries	NC	Rob Ellis
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#### 5.2.1 Establishing reporting boundaries

The organization shall establish and document its reporting boundaries, including the		Operational boundaries are defined in section 6, including a list of exclusions (TSMC sales offices,
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identification of direct and indirect GHG emissions and removals associated with the organization's operations.

offsite chemical storage, mobile sources).

**5.2.2 Direct GHG emissions and removals**

The organization shall quantify direct GHG emissions separately for CO2, CH4, N2O, NF3, SF6 and other appropriate GHG groups (HFCs, PFCs, etc.) in tonnes of CO2e.

Section 7 of the GHGMS describes the direct GHG emissions. Examples include PFC emissions from the CVD and etch process, and boilers / VEX combustion.

The organization should quantify GHG removals.

No removals are quantified (although RECs have been purchased as offsets).

**5.2.3 Indirect GHG emissions**

The organization shall apply and document a process to determine which indirect emissions to include in its GHG inventory.

Section 8 states the indirect GHG emissions as imported electricity.

As part of this process, the organization shall define and explain its own pre-determined criteria for significance of indirect emissions, considering the intended use of the GHG inventory.

Section 8 defines the indirect GHG emissions selected to be included in the inventory (electricity).

Whatever the intended use is, criteria should not be used to exclude substantial quantities of indirect emissions or evade compliance obligations.

No substantial quantities of indirect emissions are excluded.

Using those criteria, the organization shall identify and evaluate its indirect GHG emissions, to select the significant ones.

As stated, electricity has been selected as the indirect emission source included.

The organization shall quantify and report these significant emissions. Exclusions of significant indirect emissions shall be justified.

Emissions from electric consumption are included in the 2021 inventory.

The criteria to evaluate significance may include the magnitude/volume of the emissions, level of influence on sources/sinks, access to information and the level of accuracy of associated data (complexity of organization and monitoring). A risk assessment or other procedures (e.g. buyer requirements, regulatory requirements, concern of interested parties, scale of operation, etc.) may be used (see ISO 13065). More guidance is provided in Annex H.

Electric consumption is the significant contributor to indirect emissions (several small-scale electric vehicles are not included).

The criteria for evaluating the significance may be periodically revised. The organization should retain documented information about the revisions.

The GHGMS is reviewed annually.

### 5.2.4 GHG inventory categories

GHG emissions shall be aggregated into the following categories at the organizational level:	The 2021 GHG inventory continues to aggregate emissions into categories, including:	
a) direct GHG emissions and removals;	direct GHG emissions (process, stationary)	
indirect GHG emissions from imported energy;	indirect GHG emissions from imported energy (electricity)	
b) energy;		
c) indirect GHG emissions from transportation;	n/a	
indirect GHG emissions from products used		
d) by organization;	n/a	
indirect GHG emissions associated with the		
e) use of products from the organization;	n/a	
f) indirect GHG emissions from other sources.	n/a	
In each category, non-biogenic emissions, biogenic anthropogenic emissions and, if quantified and reported, biogenic non-anthropogenic emissions shall be separated (see Annex D).	No biogenic emissions.	
The organization should document the above categories separately at the facility level.	Categories are listed as separate line items in the inventory.	
GHG emissions should be further subdivided into subcategories consistent with the above categories. An example of subcategories is provided in Annex B.	Process emissions (direct) are further broken down by gas type.	
20	0	20

## 6 Quantification of GHG emissions and removals

6.1 Identification of GHG sources and sinks	NC	Rob Ellis
<p>The organization shall identify and document all relevant GHG sources and sinks included in its reporting boundaries. The organization shall include all relevant GHGs.</p>		<p>GHG emissions and removals are recorded in section 6 of the GHGMS.</p>
<p>GHG sources and sinks shall be identified in accordance with the categories defined in 5.2.4.</p>		<p>AWM confirmed throughout the audit that GHG sources have been identified in accordance with the categories defined in 5.2.4.</p>
<p>If the organization quantifies GHG removals, the organization shall identify and document GHG sinks contributing to its GHG removals.</p>		<p>n/a</p>
<p>The detail with which sources and sinks are identified and categorized shall be consistent with the quantification approach used.</p>		<p>AWM confirmed throughout this verification that the detail with which the sources and sinks are identified is consistent with the quantification approach.</p>
<p>The organization may exclude GHG sources or sinks for which the contribution to GHG emissions or removals is not relevant. It shall identify and explain why the GHG sources or sinks are excluded in accordance with the categories and any categorical subdivisions included in the report (see 5.2.3).</p>		<p>No mobile sources are included in the WaferTech GHG inventory as described in section 6.6.1 of the GHGMS (not reportable to EPA).</p>
5	0	5

6.2 Selection of quantification approach	NC	Rob Ellis
<b>6.2.1 General</b>		
<p>The organization shall select and use quantification methodologies that minimize uncertainty and yield accurate, consistent and reproducible results.</p>		<p>AWM confirmed via recalculation that WaferTech is using quantification methodologies that minimize uncertainty and yield accurate, consistent, and reproducible results. In addition, section 6.7 of the GHGMS addresses WaferTech's assessment of uncertainty per input, data source, and estimated risk (e.g. Purchasing data for C4F8, CF4, C2F6, CH2F2, CHF3, N2O &amp; SF6 cylinders is &lt;1% estimated risk).</p>
<p>The quantification approach should also consider technical feasibility and cost.</p>		<p>These methodologies consider technical feasibility and cost (not relevant).</p>
<p>The organization shall explain and document its quantification approach and any changes in quantification approach.</p>		<p>Section 6.6.2 of the GHGMS explains and documents WaferTech's quantification approach.</p>



### 6.2.2 Data selection and collection used for quantification

The organization shall identify and document its data for each source or sink classified as direct or indirect emissions and removals. It shall determine and document the characteristics for each relevant data used for quantification (see 5.2.3). Section 6.7 documents the data source for each input.

Annex C provides guidance on the selection and collection of data used for quantification. n/a.

### 6.2.3 Selection or development of GHG quantification model

Except in the case of measurement of emissions and removals, the organization shall select or develop models for the quantification approach. WaferTech is using direct measurement for emissions and removal (input gasses).

A model is a representation of how the source or sink data used for quantification are converted into emissions or removals. A model is a simplification of physical processes that has assumptions and limitations. n/a

The organization shall explain and document the justification for the selection or development of the model, considering the following model characteristics: n/a

how the model accurately represents the  
a) emissions and removals; n/a

b) its limits of application; n/a

c) its uncertainty and rigor; n/a

d) the reproducibility of results; n/a

e) the acceptability of the model; n/a

the origin and level of recognition of the  
f) model; n/a

g) the consistency with the intended use. n/a

15 0 15

### 6.3 Calculation of GHG emissions and removals NC Rob Ellis

The organization shall calculate GHG emissions and removals in accordance with the quantification approach selected (see 6.2). Attachment 14 records WaferTech's 2022 calculations in accordance with the quantification approach selected.

The period for which GHG emissions and removals have been calculated shall be WaferTech reports emissions annually (calendar year).

reported.		
The organization shall convert the quantity of each type of GHG to tonnes of CO2e using appropriate GWPs.		Attachment 14 presents WaferTech's inventory in tonnes of CO2e. AWM verified appropriate GWPs were used.
The latest IPCC's GWP should be used. If not, justification shall be provided. The GWP time horizon shall be 100 years. Other GWP time horizons may be used, but reported separately.		See above.
The organization shall quantify biogenic emissions or removals in accordance with Annex D.		No biogenic emissions reported for RY2022.
The organization shall quantify emissions or removals from imported electricity that is consumed by the organization, and of exported electricity generated by the organization, in accordance with Annex E.		Electricity consumption was quantified in the RY2022 inventory, and there was no electricity exported from generation.
<i>Specific guidance concerning emissions or removals from agriculture is provided in Annex G.</i>		n/a.
7	0	7

**6.4 Base-year GHG inventory** **NC** **Rob Ellis**

**6.4.1 Selection and establishment of base year**

The organization shall establish a historical base year for GHG emissions and removals for comparative purposes or to meet GHG programme requirements or other intended uses of the GHG inventory.		WaferTech has selected RY2011 as the baseline year (as stated in section 1.1 of the GHGMS).
Base-year emissions or removals may be quantified based on a specific period (e.g. a year or part of a year where seasonality is a feature of the organization's activity) or averaged from several periods (e.g. several years).		This baseline year is quantified on the same calendar year basis as all other inventory years.
If sufficient information on historical GHG emissions or removals is not available, the organization may use its first GHG inventory period as the base year.		Reporting year 2011 was the first year reported under the ISO 14064-1 GHGMS.
In establishing the base year, the organization:		Section 6.9 of the GHGMS records WaferTech's decision on selecting 2011 as the base-year inventory as well as the criteria that would prompt a rebaseline. There has been no trigger to re-baseline.

shall quantify base-year GHG emissions and removals using data representative of the organization's current reporting boundary, typically single-year data, a consecutive		
a) multi-year average or a rolling average;		See above.
shall select a base year for which verifiable GHG emissions or removals data are		
b) available;		See above.
c) shall explain the selection of the base year;		See above.
shall develop a GHG inventory for the base year consistent with the provisions of this		
d) document.		See above.
The organization may change its base year, but shall justify any change to the base year.		See above.
<b>6.4.2 Review of base-year GHG inventory</b>		
To ensure the representativeness of the base-year GHG inventory, the organization shall develop, document and apply a base-year review and recalculation procedure to account for substantial cumulative changes in base-year emissions resulting from:		As stated in 6.9, WaferTech has established a set of criteria prompting recalculation of the base-line inventory (e.g. EPA revised GHG reporting regulations require changed reporting for 2011).
a structural change in reporting or organizational boundaries (i.e. merger,		
a) acquisition or divestiture), or		See above.
a change in calculation methodologies or		
b) emission factors, or		See above.
the discovery of an error or a number of cumulative errors that are collectively		
c) substantial.		See above.
The organization shall not recalculate its base-year GHG inventory to account for changes in facility production levels, including the closing or opening of facilities.		Not applicable.
The organization shall document base-year recalculations in subsequent GHG inventories.		RY2011 baseline calculations are included in the GHGMS as Attachment 1.
15	0	15

## 7 Mitigation activities

7.1 GHG emission reduction and removal enhancement initiatives		
	NC	Rob Ellis
The organization may plan and implement GHG reduction initiatives to reduce or prevent GHG emissions or enhance GHG removals.		Reductions are described in Section 6.8.6.
If implemented, the organization should quantify GHG emission or removal differences attributable to the implementation of GHG reduction initiatives.		see above.
If quantified and reported, the organization shall document GHG reduction initiatives and associated GHG emission or removal differences separately, and shall describe:		Reductions are described in Section 6.8.6.
a) the GHG reduction initiatives;		see above.
the spatial and temporal boundaries of the		
b) GHG reduction initiatives;		see above.
the approach (appropriate indicators) used to quantify GHG emission or removal		
c) differences;		see above.
the determination and classification of GHG emission or removal differences attributable to GHG reduction initiatives as direct or		
d) indirect GHG emissions or removals.		see above.
7	0	7

7.2 GHG emission reduction or removal enhancement projects		
	NC	Rob Ellis
If the organization reports offsets purchased or developed, the organization shall list such offsets separately from GHG reduction initiatives.	Minor	WaferTech includes a description of RECs and Offsets within the same section of the Inventory as GHG Emission Reductions and Removal Actions (6.8.6).
1	1	1

7.3 GHG emission reduction or removal enhancement targets		
	NC	Rob Ellis
The organization may set targets to reduce GHG emissions.		No GHG reduction targets have been set for RY 2022.
If the organization reports a target, the following information shall be specified and reported:		see above

period covered by the target, including the target reference year and the target completion year;		
-	completion year;	see above
-	type of target (intensity or absolute);	see above
-	category of emissions included in the target;	see above
the amount of reduction and its unit expressed in accordance with the type of target. For setting the target, the following criteria should be considered:		
-	criteria should be considered:	see above
-	climate science;	see above
-	reduction potential;	see above
-	international, national context;	see above
sectorial context (e.g. voluntary sectorial commitment, cross-sectorial effect).		
-	commitment, cross-sectorial effect).	see above
10	0	10

## 8 GHG inventory quality management

8.1 GHG information management	NC	Rob Ellis
8.1.1 The organization shall establish and maintain GHG information management procedures that:		See below:
a) ensure conformity with the principles of this document;		The GHGMP overall contains these procedures, specifically Section 6.10 GHG Information Management, and the FAB11 EMS Records Management O.I.
b) ensure consistency with the intended use of the GHG inventory;		see above
c) provide routine and consistent checks to ensure accuracy and completeness of the GHG inventory;		Section 6.11 Auditing & Verification, Section 6.12 Management Review, and Section 6.13 Corrective Action define these checks.
d) identify and address errors and omissions;		see above
e) document and archive relevant GHG inventory records, including information management activities and GWPs.		Section 13.2 Records Management and Reducing Uncertainty contains information on retention of records, which were available as requested during the re-calculation.
8.1.2 The organization's GHG information management procedures shall document their consideration of the following:		See below:
a) identification and review of the responsibility and authority of those responsible for GHG inventory development;		Section 6.10.3.3 states the EH&S Manager and Facilities Director are responsible for the final review and approval.
b) identification, implementation and review of appropriate training for members of the inventory development team;		Section 6.10.3 covers formal and informal training for identified roles in preparing the report
c) identification and review of organizational boundaries;		Section 6.11 states that the GHGMS is audited at least annually.
d) identification and review of GHG sources and sinks;		Section 6.11 states that the GHGMS is audited at least annually.
e) selection and review of quantification approaches, including data used for quantification and GHG quantification models that are consistent with the intended use of the GHG inventory;		Section 6.11 states that the GHGMS is audited at least annually.
f) review of the application of quantification approaches to ensure consistency across multiple facilities;		Section 6.11 states that the GHGMS is audited at least annually.

use, maintenance and calibration of			Section 6.8 Data Management contains information on collection of data
g) measurement equipment (if applicable);			
development and maintenance of a robust			Section 6.8 Data Management contains information on collection of data
h) data-collection system;			
i) regular accuracy checks;			Section 6.11 states that the GHGMS is audited at least annually.
j) periodic internal audits and technical reviews;			Section 6.11 states that the GHGMS is audited at least annually.
periodic review of opportunities to improve			Section 6.12 states that the GHGMS will be reviewed by top management at least annually.
k) information management processes.			
18	0	18	

**8.2 Document retention and record keeping**      **NC**      **Rob Ellis**

The organization shall establish and maintain procedures for document retention and record keeping.      Wafertech references A-RMS-08-03-156 FAB11 EMS RECORDS MANAGEMENT O.I. for document and records management.

The organization shall retain and maintain documentation supporting the design, development and maintenance of the GHG inventory to enable verification. The documentation, whether in paper, electronic or other format, shall be handled in accordance with the organization's GHG information management procedures for document retention and record keeping.      Section 11 Data Management lays out processes for maintaining information on the GHG inventory. Per verification activities, all required documentation was available to complete re-calculations.

2	0	2	
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**8.3 Assessing uncertainty**      **NC**      **Rob Ellis**

The organization shall assess the uncertainty associated with the quantification approaches (e.g. data used for quantification and models) and conduct an assessment that determines the uncertainty at the GHG inventory category level.      Uncertainty is assessed in Section 6.7 Assessment of Uncertainty.

Where quantitative estimation of uncertainty is not possible or cost effective, it shall be justified and a qualitative assessment shall be conducted.      Quantitative estimates are available for each, ranging from less than 1% (purchasing records) to 15% (facilities trends and kitchen use assumptions).

The organization may apply the principles and methodologies of ISO/IEC Guide 98-3 in completing the uncertainty assessment.      n/a

3	0	3	
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## 9 GHG reporting

9.1 General	NC	Rob Ellis
The organization should prepare a GHG report, consistent with the intended uses of the GHG inventory, to facilitate GHG inventory verification. For example, a GHG report may be necessary for participation in a GHG programme or to inform external or internal users.		Wafertech has prepared a report in accordance with procedures in Section 14, and is included as Attachment 14.
A GHG report shall be prepared if the organization chooses to have its GHG inventory verified or makes a public GHG statement claiming conformity with this document.		see above.
GHG reports shall be complete, consistent, accurate, relevant, transparent and planned in accordance with 9.2.		Per review of the program and verification of the data, the GHG report was complete and accurate.
If the organization's GHG statement has been independently (third-party) verified, the verification statement shall be made available to intended users.		WaferTech provides the verification statement to the intended user of TSMC.
If confidential data are withheld from inclusion in a GHG report, this shall be justified. If the organization decides to prepare a GHG report, 9.2 and 9.3 apply.		No confidential data is withheld from the report.
5	0	5

9.2 Planning the GHG report	NC	Rob Ellis
The organization shall explain and document the following in planning its GHG report:		See below:
purpose and objectives of the report in the context of the organization's GHG policies, strategies or programmes, and applicable		GHGMP purpose and objectives are included in Section 1.
a) GHG programmes;		
intended use and intended users of the GHG		GHGMP intended use and users are documented in Section 6.14 Reporting of GHG (US EPA and WA State, Department of Ecology, and TSMC).
b) inventory;		
overall and specific responsibilities for		The responsibilities preparing and producing the report are assigned to the Environmental Engineer in GHGMP Section 6.14.3.
c) preparing and producing the report;		
d) frequency of the report;		GHGMP Section 6.14 defines this as annually.



e) report structure and format;			GHGMP Section 6.14 defines the structure and format, 6.14.3.1 Direct emissions, quantified separately by GHG and by-product, 6.14.3.2 Heat transfer fluid emissions, 6.14.3.3 Stationary (combustion) equipment emissions, 6.14.3.4 Indirect GHG emissions from electricity, and 6.14.3.5 Explanations of any change to the base year or other historical GHG data.
data and information to be included in the			
f) report;			see above
policy on availability and methods of			
g) dissemination of the report.			see above
8	0	8	

<b>9.3 GHG report content</b>	<b>NC</b>	<b>Rob Ellis</b>
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**9.3.1 Required information**

The organization's GHG report shall describe the organization's GHG inventory. Its content may be structured as recommended in Annex F.		see below
GHG report content shall include the following:		see below
a) description of the reporting organization;		Included in section 2 Scope.
b) person or entity responsible for the report;		Section 6.10 - EH&S Manager & Facilities Director
c) reporting period covered;		2022 - Attachment 14
d) documentation of organizational boundaries (5.1);		Included in section 2 Scope.
e) documentation of reporting boundaries, including criteria determined by the organization to define significant emissions;		Included in section 2 Scope, Section 6.4 Operational Boundaries.
f) direct GHG emissions, quantified separately for CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O, NF <sub>3</sub> , SF <sub>6</sub> and other appropriate GHG groups (HFCs, PFCs, etc.) in tonnes of CO <sub>2</sub> e (5.2.2);		Section 7 Direct GHG Emissions contains mentions of all of these
g) a description of how biogenic CO <sub>2</sub> emissions and removals are treated in the GHG inventory and the relevant biogenic CO <sub>2</sub> emissions and removals quantified separately in tonnes of CO <sub>2</sub> e (see Annex D);		No biogenic sources or removals.
h) if quantified, direct GHG removals, in tonnes of CO <sub>2</sub> e (5.2.2);		No removals.
i) explanation of the exclusion of any significant		No significant sources were excluded.

GHG sources or sinks from the quantification (5.2.3);	
j) quantified indirect GHG emissions separated by category in tonnes of CO <sub>2</sub> e (5.2.4);	Recorded in Attachment 14.
k) the historical base year selected and the base-year GHG inventory (6.4.1);	The base-year selection of 2011 is defined in Section 6.9.
l) explanation of any change to the base year or other historical GHG data or categorization and any recalculation of the base year or other historical GHG inventory (6.4.1), and documentation of any limitations to comparability resulting from such recalculation;	no changes have been made to the base year
m) reference to, or description of, quantification approaches, including reasons for their selection (6.2);	Section 6.6.2 Quantification of GHG Emissions and Removals defines these approaches.
n) explanation of any change to quantification approaches previously used (6.2);	No changes have been made to the quantification approaches for RY2022.
o) reference to, or documentation of, GHG emission or removal factors used (6.2);	No removals are made.
p) description of the impact of uncertainties on the accuracy of the GHG emissions and removals data per category (8.3);	Uncertainties are detailed in Section 6.7 Assessment of Uncertainty.
q) uncertainty assessment description and results (8.3);	Uncertainties are detailed in Section 6.7 Assessment of Uncertainty.
r) a statement that the GHG report has been prepared in accordance with this document;	Section 1 Purpose lists ISO 14064-1 as a criteria for reporting.
s) a disclosure describing whether the GHG inventory, report or statement has been verified, including the type of verification and level of assurance achieved;	n/a - per this report.
t) the GWP values used in the calculation, as well as their source. If the GWP values are not taken from the latest IPCC report, include the emissions factors or the database reference used in the calculation, as well as their source.	GWPs are included in Attachment 14.

**9.3.2 Recommended information**

The organization should consider including in the GHG report:

Considerations were made to include recommended information where applicable. For example, EHS policy is included in Section 5 Environmental, Health and Safety Policy.

description of the organization’s GHG policies, a) strategies or programmes;	See above.
if appropriate, description of GHG reduction initiatives and how they contribute to GHG emission or removal differences, including those occurring outside organizational boundaries, quantified in tonnes of CO2e b) (7.1);	See above.
if appropriate, purchased or developed GHG emission reductions and removal enhancements from GHG emission reduction and removal enhancement projects, quantified c) in tonnes of CO2e (7.2);	See above.
as appropriate, description of applicable GHG d) programme requirements;	See above.
GHG emissions or removals disaggregated by e) the facility;	See above.
f) total quantified indirect GHG emissions;	See above.
description and presentation of additional indicators, such as efficiency or GHG emission intensity (emissions per unit of production) g) ratios;	See above.
assessment of performance against appropriate internal and/or external h) benchmarks;	See above.
description of GHG information management i) and monitoring procedures (8.1);	See above.
GHG emissions and removals from the j) previous reporting period;	See above.
if appropriate, explanation of GHG emissions differences between the present inventory and the k) previous one.	See above.
The organization may aggregate direct emissions and direct removals.	n/a

**9.3.3 Optional information and associated requirements**

The organization may report optional information separately from the required information and the recommended information. Each type of optional information described below should be reported separately from the others.

see below

<p>The organization may report the results of contractual instruments for GHG attributes (market based approach), expressed in GHG emissions (tCO<sub>2</sub>e) as well as in the unit of transfer (e.g. kWh). The organization may report the amount purchased compared to the amount consumed.</p>		<p>RECs were purchased to offset electrical consumption.</p>
<p>The organization may report offsets or other types of carbon credits. If so, the organization:</p>		<p>Carbon Offsets were used for Scope 1 emissions.</p>
<p>shall disclose the GHG scheme under which they were generated;</p>	<p>Minor</p>	<p>The Offset Scheme is not defined in the GHGMP.</p>
<p>may add offsets or other types of carbon credits together if they originate from the same GHG scheme and are of appropriate vintage;</p>		<p>n/a</p>
<p>shall not add or subtract offsets or other types of carbon credits from the organization's inventory of its direct or indirect emissions.</p>		<p>n/a</p>
<p>The organization may report GHGs stored in GHG reservoirs.</p>		<p>n/a</p>
<p>42</p>	<p>1</p>	<p>42</p>

**10 Organization's role in verification activities**

10 Organization's role in verification activities	NC	Rob Ellis
<p>The organization may decide to conduct a verification.</p>		<p>AWM has been contracted to conduct an independent verification of EY2022 data.</p>
<p>To review GHG emissions and removals information, impartially and objectively, the organization shall conduct a verification consistent with the needs of the intended user. Principles and requirements are described in ISO 14064-3.</p>		<p>Per AWM's verification program.</p>
<p>Requirements for verification bodies are described in ISO 14065.</p>		<p>Per AWM's verification program.</p>
<p>Requirements for the competence of validation teams and verification teams are described in ISO 14066.</p>		<p>Per AWM's verification program.</p>
<p>4</p>	<p>0</p>	<p>4</p>

Location / Activity	Source	Status	Issue / Corrective Action
Stationary Natural Gas	Data Review	Closed	Please provide natural gas data (invoices if possible). Emails provided - is it possible to package these as one pdf or individual pdf's? Included in Email #4 file.
SF6	Data Review	Closed	Why did consumption increase so much? (+15% yoy) SF6 usage increased due to 2 factors: a. Production increased 2% in 2022 and the technology mix also changed to run more SF6 recipes b. Etch process group updated recipe usage amounts and introduced a 2 new SF6 processes for wafer Etching/Cleaning
N2O	Data Review	Closed	Why did consumption increase so much? (+10% yoy) N2O usage increased because production increased 2% in 2022 and the technology mix also changed to run more N2O recipes.
CH2F2	Data Review	Closed	Why did consumption decrease so much? (-16% yoy) CH2F2 usage decreased due to the mix of recipes ran in the Etch process tools.
CH3F	Data Review	Closed	Why did consumption decrease so much? (-46% yoy) CH3F will typically use 2-3 cylinders in a year. In 2021 we used 3 cylinders and only 2 cylinders in 2022
HTF	Data Review	Closed	Why did consumption decrease so much? (-95% yoy) F-HTF consumption decreased due to the accounting of switching from FC-770 to FC-3283. Our equipment capacity of FC-770 decreased by 315 liters and our equipment capacity for FC-3283 increased by 365.4 liters. FC-3283 replaced FC-770's 315 L of capacity and we added 4 chambers that increased FC-3283's capacity an additional 50.4 L. Please see the subpart I calculation tool for the calculation of consumption/emissions.
Offsets / RECs	Data Review	Closed	Data file for Offsets only total 70,000. I have included evidence of the purchase of an additional 50,000 carbon offsets. "The"A" after the company name is for Active. The tonnes are all in your active account." I have included the email from the broker as an attachment. 2 files total the 109,784: Email #2 folder - "unnamed.png" and "image002"
	Data Review	Closed	Please provide supporting evidence and calculations for the "2022 RECs for electricity used" value of 45,870.2581. REC purchases exceed total electricity consumption. Value reported is equal to scope 2 emissions.
	Data Review	Closed	Please provide supporting evidence and calculations for the "2022 Carbon Offsets Scope 1" value of 98,611.00. Offsets retired exceed total amount of Scope 1 emissions. Value reported is equal to scope 1 emissions.
	Data Review	Closed	Please provide evidence of retirement for the 50,000 credits. "CE_WaferTech_2023-03" contains evidence of retirement.
CF4	Data Review	Closed	Please provide consumption records (e.g. "2021 WaferTech Evidence for Gas usage usage"). "2022 WaferTech Evidence for Gas usage usage" presentation
CHF3	Data Review	Closed	Please provide consumption records (e.g. "2021 WaferTech Evidence for Gas usage usage"). "2022 WaferTech Evidence for Gas usage usage" presentation
SF6	Data Review	Closed	Please provide consumption records (e.g. "2021 WaferTech Evidence for Gas usage usage"). "2022 WaferTech Evidence for Gas usage usage" presentation

Location / Activity	Source	Status	Issue / Corrective Action
7.2 GHG emission reduction or removal enhancement projects	Conformance Review	Closed	<p>WaferTech includes a description of RECs and Offsets within the same section of the Inventory as GHG Emission Reductions and Removal Actions (6.8.6). ("If the organization reports offsets purchased or developed, the organization shall list such offsets separately from GHG reduction initiatives.")</p> <p>A-RMS-02-03-013 Sec 6.3.1.3 states "Residual Scope 1 and Scope 2 emissions will be offset through the purchases of renewable energy credits and carbon offsets." This section is separate from GHG reduction initiatives.</p>
9.3.3 Optional information and associated requirements	Conformance Review	Closed	<p>The Offset Scheme is not defined in the GHGMP. ("The organization may report offsets or other types of carbon credits. If so, the organization: - shall disclose the GHG scheme under which they were generated;")</p> <p>This is optional information and WaferTech shall treat this item as an OFI to include the offset scheme in our GHG Management Plan.</p>