
MEMC ELECTRONIC MATERIALS SDN BHD - KL PLANT

GHG Inventory Reporting

BASE YEAR 2020

TABLE OF CONTENTS

SECTION #	TITLE	PAGE #
	EXECUTIVE SUMMARY	3
1.0	ABOUT THIS REPORT	6
1.1	Report objective	
1.2	General	
2.0	INTRODUCTION AND REPORTING INFORMATION	7
2.1	General	
2.2	Descriptive Information	
2.3	Greenhouse Gas Policy	
2.4	Management System Certification	
2.5	KL Plant Organization Chart	
2.6	GHG Inventory Reporting Committee	
3.0	GREENHOUSE EMISSION DATA	12
4.0	DESCRIPTION OF METHODOLOGIES AND DATA USED	13
5.0	DETAIL GREENHOUSE ACTIVITY DATA AND EMISSIONS	15
5.1	Scope 1	
5.2	Scope 2	
6.0	CARBON EMISSION REDUCTION PLAN AND PROGRAMMES	17
7.0	GLOSSARY	18

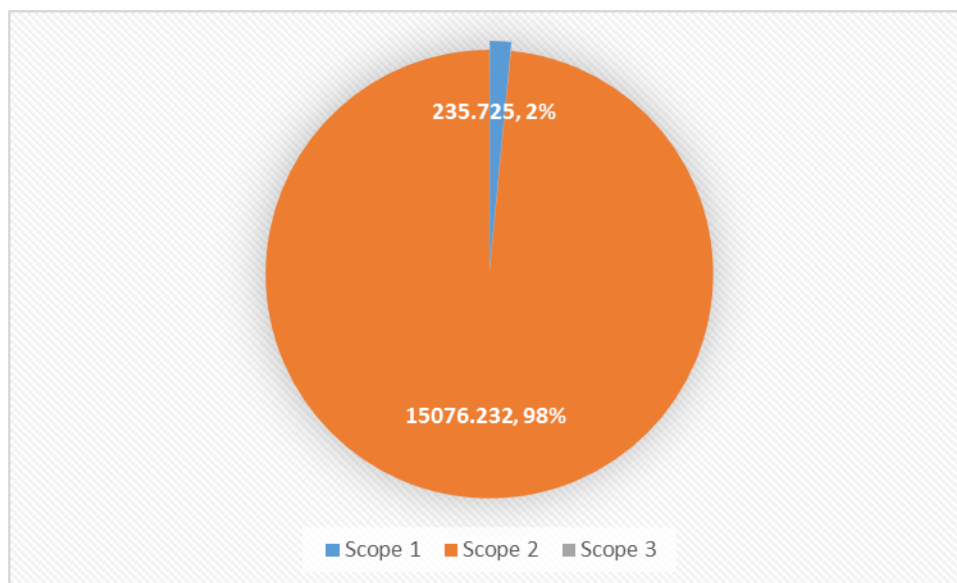
8.0	ATTACHMENT	20
8.1	MEMC Operational Boundary Diagram	
8.2	GHG Data Collection & Calculation	
8.3	ISO14001:2015 Certificate	

Executive Summary

MEMC has demonstrated a commitment to disclosing company performance on a range of environmental parameters, including GHG emissions. This report, covering calendar years 2020 which also set as baseline year incorporating datasets from operations at their plant in Petaling Jaya.

A total of 15311.957 tonnes of CO₂ equivalent (tCO₂e) were emitted during year 2020 with Scope 2 is largest contributor for MEMC's emissions. The breakdown emission by scope is as follows:

- Scope 1 Direct emissions: 235.725 tCO₂e (1.5%)
- Scope 2 Indirect emissions: 15,076.232 tCO₂e (98.5%)
- Scope 3 emissions: Not reported



Scope 1 emissions major contributor is from leakage of refrigerant for air conditioning follows by LPG related emissions activities from forklift and dryers. Scope 2 emissions are generated from the grid electricity consumption for the plant and building operation.

Emission Improvement Opportunities

Based on the findings of this carbon footprint assessment, MEMC has a concrete reason to reduce its carbon emissions particularly for Scope 1 and 2 emissions. The reduction plan among others are:

- Establishment of an energy management system to effectively managed and properly plan energy reduction initiatives programme.
- Explore potential use of renewable energy solutions - such as rooftop Solar Photovoltaic - to offset Scope 2 emissions. Currently Malaysia has a renewable energy net-metering mechanism that allow facilities to install solar photovoltaic panels and generate clean energy as part of its long-term carbon off-setting strategy.

1 About this report

MEMC Electronic Materials Sdn Bhd (also referred to as "MEMC" or "the company" located in Petaling Jaya, Malaysia) is seeking to report its carbon footprint annually, to measure the trend of its carbon emissions on a company-wide level. For this purpose, MEMC has carried out the carbon footprint assessment of its business activities.

1.1 Report objective

The objective of this report is to build the greenhouse gas (GHG) emissions reporting exercise for the organization level. This will enable MEMC to continue monitoring carbon emissions for its core operations in Petaling Jaya, Malaysia. The report will then be used to demonstrate the level of emission by the organization. It will also enable the organization to develop an action plan to minimize the emission and its value to MEMC's customer globally.

1.2 General

This report illustrates the reporting requirements based on the ISO 14064-1 and from the GHG Protocol Corporate Standard.

2 Introduction and Reporting Information

2.1 General

MEMC Electronic Materials Sdn Bhd has always been concerned about their operation environmental impacts. Due to this they have started various environmental programmes and has been certified under the ISO 14001:2015 Environmental Management System. To strengthen further its environmental commitment particularly on climate change commitment, MEMC has embarked into the implementation of GHG emissions accounting report for its corporate level. This reporting is the first GHG report and set as a baseline reporting for the company.

2.2 Descriptive Information

Table 1 describes the background of the company information and its business operation as well as the basis for the GHG emission reporting.

Table 1 Descriptive information

Descriptive information	Company response
Company name, address & contact person	MEMC Electronic Materials Sdn Bhd Jalan SS 8/2, Sungai Way Free Industrial Zone, 47300 Petaling Jaya, Selangor, Malaysia Tel:+603 78773277 Contact Person: Abdul Ghaffar HR & ESH Manager
Description of the company	MEMC Electronic Materials Sdn Bhd is part of GlobalWafers, a global leader in semiconductor technology, providing innovative, advanced technology solutions to leading chip

	<p>manufacturers to transform lives around the world.</p> <p>GlobalWafers produces advanced semiconductors for electronics, employing leading-edge design and manufacturing. They utilize their own electronic-grade silicon, through a fully-integrated manufacturing strategy with strict quality control across each step of the process. This strategy enables GlobalWafers to deliver a steady supply of exceptionally pure silicon that can be blend-tailored to meet specific customer requirements. The result is maximum yield and efficient delivery to customers – as well as superior value.</p>
Organizational Boundary (Consolidation Approach chosen)	Operational Control Approach for MEMC operation located at Jalan SS8/2, Sungai Way Free Trade Zone, 47300 Petaling Jaya, Selangor, Malaysia GPS Coordinates:3.08868, 101.61042
Description of the businesses and operations included in the company's organizational boundary	The company business operation is focus on production of 6 inches polished silicon wafer
Reporting period	January-December 2020
Operational Boundary	<p>The following scopes are reported in this report:</p> <p>Scope 1 – Direct Emission</p> <p>Scope 2 – Indirect Emission</p> <p>GHG Gases Reported: All 7 gases (CO₂, CH₄, NO₂, HFC, PFC, Sox, NF₃) as required by Kyoto Protocol wherever applicable to the operation</p>
A list of Scope 3 activities included in the report	Scope 3 is not reported

Baseline year	2020 is chosen as base year as this is the first time the company is reporting and based on its completed and available data from January to December period
Changes since last report	This report is the first reporting and been chosen as the base year. Changes, if any, will be reported in subsequence reporting.
Reporting criteria and GWP reference	GHG Protocol Corporate Accounting, ISO14064-1, GWP reference: IPCC AR6

2.3 Greenhouse Gas Policy

MEMC Electronic Materials Sdn Bhd adopts Greenhouse Gas Policy set by corporate.

Greenhouse Gas Policy

GlobalWafer commit to uphold a sustainable business. We proactively communicate and work in tandem with stakeholders to combat adverse environmental impact and aspire to become a leader in sustainability.

Whereas global warming has become increasingly severe, and that greenhouse gas worsens the Earth's environment, GlobalWafers, being citizen of the Earth, are dedicated to fulfill our corporate social responsibilities:

- (1) Pay attention to environmental protection issues such as global climate changes;
- (2) Monitor our greenhouse gas emission status;
- (3) Formulate reduction and adjustment strategies pursuant to international and local greenhouse gas policies; and
- (4) Raise the internal environmental perception, responsibility, and commitment

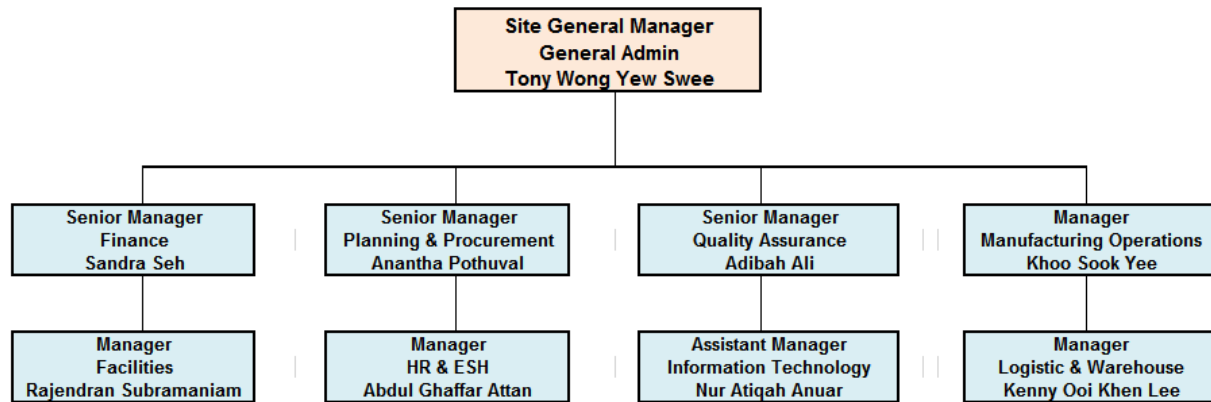
2.4 Management System Certification

MEMC Electronic Materials Sdn Bhd is certified for ISO14001:2015 by SIRIM QAS International. The company is audited by the certification body every three years for re certification and yearly surveillance audit will be conducted. The company is recently audited by SIRIM in December 2021 with zero non-conformities.

Apart from ISO14001:2015, MEMC Electronic Materials is also certified for ISO45001:2018, ISO9001:2015 and IATF16949:2016. In line with corporate direction, MEMC KL is also working towards enhancing its Responsible Business Alliance (RBA) requirements.

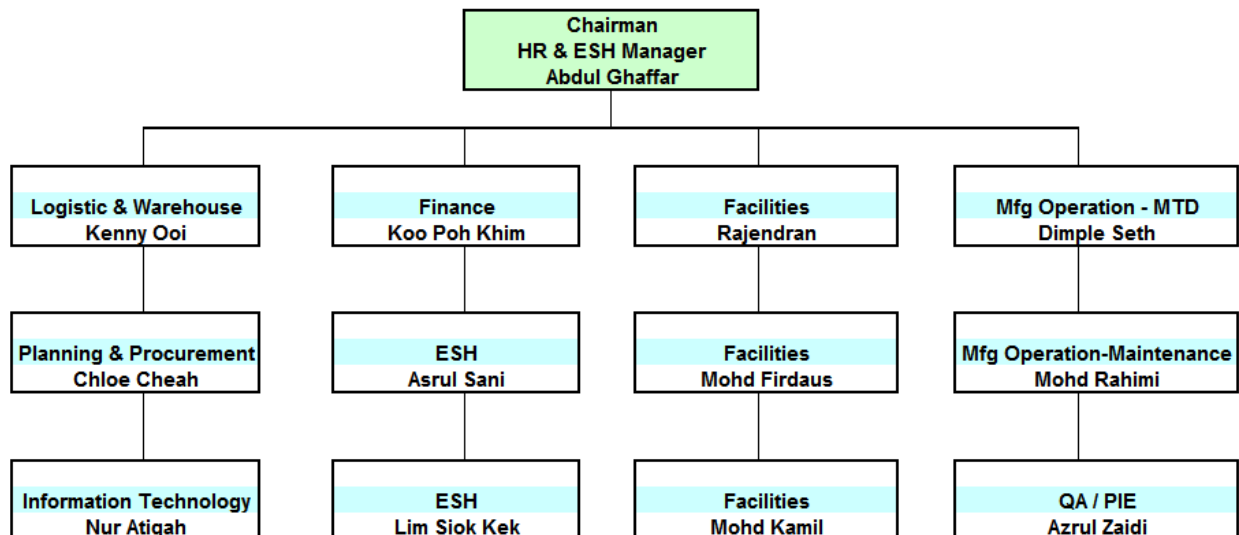
2.5 KL Plant Organization Chart

MEMC ELECTRONIC MATERIALS SDN. BHD. ORGANIZATION CHART - KL HODs



2.6 GHG Inventory Reporting Committee

MEMC ELECTRONIC MATERIALS SDN. BHD. ISO14064-1 CARBON ACCOUNTING & GHG INVENTORIES COMMITTEE



3 Greenhouse gas emissions data

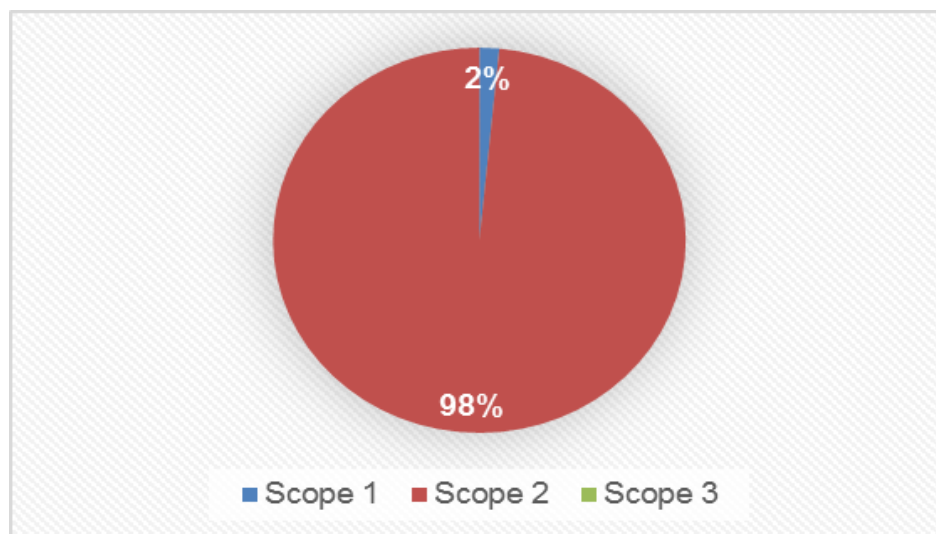
MEMC has emitted 15,311.957 tCO₂e for a reporting period of January to December 2020.

Table 2 shows the summary of the emission including the breakdown by its scopes.

Table 2 Summary of GHG Emissions

Scopes and categories ¹	Metric tons CO ₂ e
Scope 1: Direct emissions from owned/controlled operations	235.725
Scope 2: Indirect emissions from the use of purchased electricity, steam, heating, and cooling	15076.232
Total Emissions	15,311.957

Figure 1 Breakdown Percentage of Different Scope of Emissions

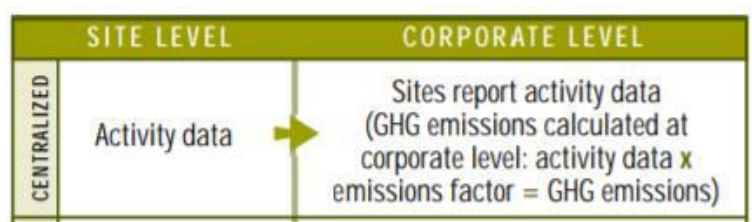


4 Description of methodologies and data used

The methodologies used for the emission calculation is based on the approach of rolling up GHG emissions data from different units within the plant.

The approach for gathering data on GHG emissions are centralized at the plant GHG Inventories Committee. Relevant activity data of each unit such as the quantity of fuel used were collected and reported to the committee, where GHG emissions are calculated as illustrated in the table below. All the activities were compiled in the GHG inventory worksheet.

Table 3 GHG emission calculation approaches (*Source: GHG Protocol*)



The detail of the methodologies for each scope and activities data were calculated as describes in the following Table 4.

Table 4 Description of methodologies

Scope	Description of methodologies used to calculate or measure emissions
Scope 1	Activity: Stationary (Genset, Pumps and Dryers), Refrigerant of Air-Conditioning for the plant and mobile combustion as follows, <ul style="list-style-type: none">o Forklift – based on data recordo Company vehicle –based on data record Data source: Data are based on fuel consumption record of the company and refrigerant top-up provided by service providers Calculation Tools used: UK Government GHG Conversion Factors for Company Reporting Version 1.0 Year 2021 Tools, GHG Protocol HFC

	<p>PFC Tools</p> <p>EF Reference: IPCC guidelines, GHG Protocol Conversion Factors</p>
Scope 2	<p>Activity: Energy purchased (Electricity)</p> <p>Data Source: Facilities department data based on public utility bill record</p> <p>Calculation Tools Used: None</p> <p>EF Reference: P. Malaysia Grid Utility Combined Margin, MGTC 2017-CDM-Electricity-Baseline-Final-Report</p>

5 Detail greenhouse activity data and emissions

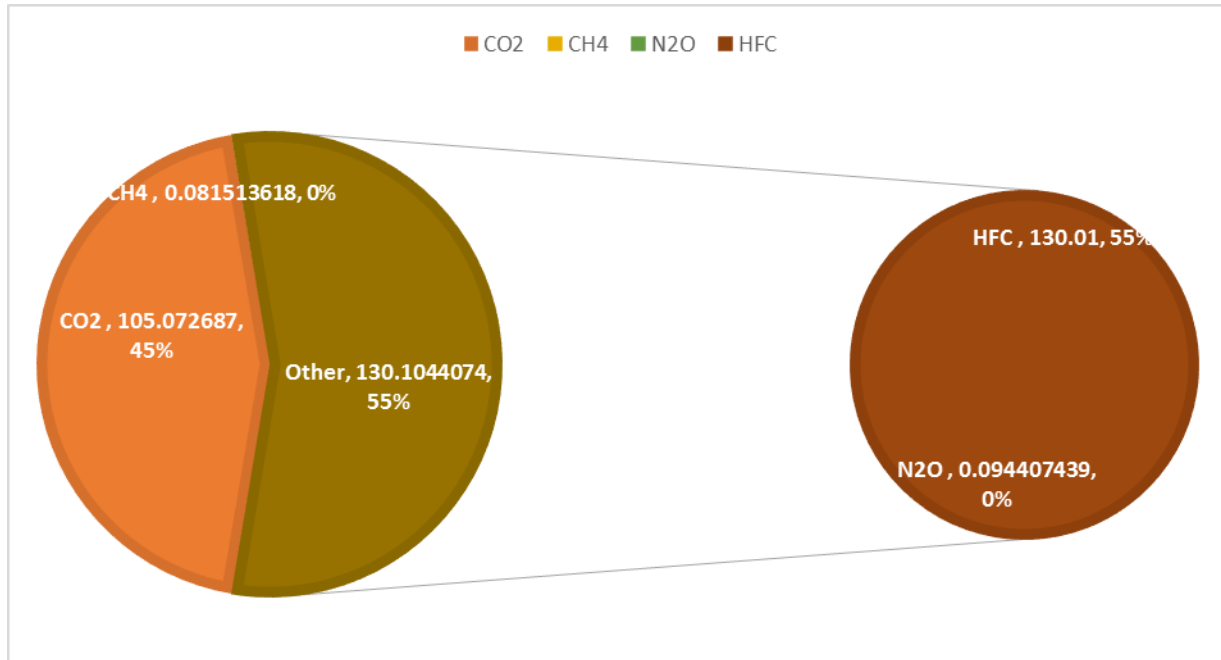
Overall activity data and detailed GHG emission for each activity are listed below for Scope 1 and Scope 2.

5.1 Scope 1

Scope 1 emission activities come from mobile transport (forklift and company car), stationary combustion (generator set for back-up power supply, dryer, kitchen & firefighting pump) and refrigerant leakage for air-conditioning.

Scope	Carbon Emission (tCO ₂ e)	CO ₂	CH ₄	N ₂ O	HFC
Total	235.725	105.073	0.08151	0.09441	130.01
Forklift - LPG	10.493	10.479	0.008140	0.00653	
Sludge Dryer - LPG	62.606	62.519	0.048564	0.038979	
Canteen – LPG	29.980	29.938	0.023256	0.018666	
Company Car – Petrol	0.469	0.4665	0.0014684	0.001346	
Genset & Fire Fighting Pump - Diesel	2.164	2.134	0.000208	0.02976	
Refrigerant	130.01				130.01

Figure 2 Breakdown Percentage of Different GHG Gasses Emitted



5.2 Scope 2

The emissions for Scope 2 are from purchased energy in a form of electricity from the national grid. The organization wholly depends on the national grid power supply for its operation as there is no own generation facility installed including renewable energy.

Corresponding Activity	Fuel and Material Description	Activity Data	Carbon Emission (tCO2e)
Purchased Energy	Electricity	25,771,337 kWh	15,076.232

6 Carbon Emission Reduction Plan and Programmes

The information on the company's GHG management programmes and reduction activities are as below. The company will also engaged with its supply chain and customers to improve GHG emission of its Scope 3 emissions.

- Establishment of an ISO50001 energy management system to effectively managed and properly plan energy reduction initiatives programme.
- Explore potential use of renewable energy solutions - such as rooftop Solar Photovoltaic - to offset Scope 2 emissions. Currently Malaysia has a renewable energy net-metering mechanism that allow facilities to install solar photovoltaic panels and generate clean energy as part of its long-term carbon off-setting strategy.

7 Glossary

Carbon dioxide (CO₂)

A naturally occurring gas and one of the most abundant greenhouse gases in the atmosphere. Carbon dioxide is also a by-product of industrial processes, burning fossil fuels and land-use changes.

Carbon dioxide equivalent (CO₂e)

The unit of measurement used to compare the relative climate impact of the different greenhouse gases. The CO₂e quantity of any greenhouse gas is the amount of carbon dioxide that would produce the equivalent global warming potential.

Carbon footprint

A carbon footprint is the total set of greenhouse gas (GHG) emissions caused by an organisation, event or product. For simplicity of reporting, it is often expressed in terms of the amount of carbon dioxide, or its equivalent of other GHGs emitted.

Climate change

A change in global climate attributed directly or indirectly to human activity and in addition to natural climate variability observed over comparable periods.

Emissions factor

A measure of the average amount of a specific pollutant or material discharged into the atmosphere by a specific process, fuel, equipment, or source. It is expressed as a number of kilogrammes of particulate per tonne of the material or fuel.

Global warming

The increase in the average temperature of the Earth's surface as a result of the accumulation of greenhouse gases in the atmosphere.

Greenhouse gas (GHG)

Greenhouse gases are gases in the atmosphere that absorb and emit infrared radiation. This process is the fundamental cause of the greenhouse gas effect. The main greenhouse gases are water vapour, carbon dioxide, methane, nitrous oxide and ozone.

GHG Protocol

The Greenhouse Gas Protocol (GHG Protocol) is the most widely used international accounting tool for government and business leaders to understand, quantify, and manage greenhouse gas emissions.

IPCC

The Intergovernmental Panel on Climate Change (IPCC) is an intergovernmental body of the United Nations that is dedicated to providing the world with an objective, scientific information relevant to understanding the scientific basis of the risk of human-induced climate change, its natural, political, and economic impacts and risks, and possible response options.

8 ATTACHMENT

8.1 MEMC Location



8.2 MEMC Operational Boundary



8.3 GHG Data Collection & Calculation

Green House Gas Reporting Data Collection

Base year: 2020 (Jan/01/2020 to Dec/31/2020)

Completion Date : Nov/30/2021

GHG Inventory Boundaries : Organizational boundary control approach

Operational boundary : Scope 1 - Direct GHG emissions

Scope 2 - Energy indirect GHG emissions

Scope 3 - Other indirect GHG emissions

Scope 1 Direct emission from owned/controlled operations						
No.	Item Description	Purchased Quantity	Purchased Quantity	Purchased Amount	Emission Factor	Annual Emissions
		Weight (Kg)	Volume (Litre)	RM	kg CO ₂ e per EF unit	kg CO ₂ e
1	Forklift (LPG)	3570	NA	14,310.6	2939.29	10493.2653
2	Sludge Dryer (LPG)	21300	NA	83,070.0	2939.29	62606.877
3	Canteen gas (LPG)	10200	NA	39,780.0	2939.29	29980.758
4	Company car (petrol)	NA	201	335.0	2.33969	469.339012
5	Genset (Diesel)	NA	800	2,880.0	2.70553	2164.424
6	Fire fighting pump (Diesel)					
7	Refrigerant (R123)	90	NA	7,500.0	77	6930
8	Refrigerant (R22)	68	NA	NA	1810	123080
Total kg CO₂e						235724.663
Total t CO₂e						235.725

Scope 2 Indirect emissions from the use of purchased electricity, steam, heating, and cooling						
No.	Item Description	Usage	TNB Bill		Emission Factor	Annual Emissions
		KWH	RM		kg CO ₂ e per EF unit	kg CO ₂ e
1	Electricity Consumption	25,771,337.00	9,452,476.00		0.585	15076232.15
Total kg CO₂e						15076232.145
Total t CO₂e						15076.232
Total S1 & S2						15076.232

8.4 ISO14001:2015 Certificate



CERTIFICATE






SIRIM QAS International hereby certifies that

MEMC ELECTRONIC MATERIALS SENDIRIAN BERHAD
NO.1, JALAN SS 8/2
SUNGEI WAY FREE INDUSTRIAL ZONE
47300 PETALING JAYA
SELANGOR DARUL EHSAN
MALAYSIA

has implemented an Environmental Management System complying with

ISO 14001:2015
Environmental Management System – Requirements with Guidance for Use

Scope of Certification

MANUFACTURE OF POLISHED SILICON WAFERS.



Issue date	: 17 January 2022
Original certification date	: 03 November 2017
Expiry date	: 27 September 2024
Certificate no.	: EMS 00793

SIRIM QAS International Sdn. Bhd.
(Company No. 410334 - X)
1, Persiaran Dato' Menteri
Section 2, P.O. Box 7035
40700 Shah Alam
Selangor Darul Ehsan
MALAYSIA

Tel : 60-3-5544 6404
Fax : 60-3-5544 6787

<http://www.sirim-qas.com.my>
<http://www.malaysiancertified.com.my>


Nur Fadhilah binti Muhammad
Chief Executive Officer
SIRIM QAS International Sdn. Bhd.

<http://www.sirim-qas.com.my> This certificate is granted subject to the terms and conditions as stated in the Certification Agreement.
<http://www.malaysiancertified.com.my>

22