EXPORT CREDIT GUARANTEES OF THE FEDERAL REPUBLIC OF GERMANY

Hermes Cover

QUESTIONNAIRE FOR METAL, PLASTIC AND RUBBER PRODUCTS AS WELL AS ELECTRONICS MANUFACTURING (SECTOR-RELATED QUESTIONS)

The completion of this questionnaire is voluntary. However, replying to the relevant questions as completely as possible will facilitate and speed up the assessment of the environmental, social and human rights impacts of the project for which the German export supplies or services offered for cover are intended. This – together with the questionnaire not related to a particular sector, the completion and submission of which should also be considered in order to speed up the assessment procedure – can replace the description of the environmental, social and human rights impacts in the memorandum.

The questionnaire provides guidance on what information may be important for this sector. It is based on the World Bank/IFC General Environmental Health and Safety (EHS) Guidelines, the EHS Guidelines for Metal, Plastic, Rubber Products Manufacturing as well as the EHS Guidelines for Semiconductors and other Electronics Manufacturing. Additional information on the applicable standards can be found at the AGA Portal.

This is a list of possible questions. Depending on the individual case only some of them, or perhaps also additional information, may become relevant in the course of the application procedure. Because of the specific features of each project further clarification may be required.

CONTENT

A. Metal products manufacturing

A.1. Process and resources consumption

- Please give a technical description of the individual process steps (e.g. sintering plant, forming processes, thermal treatment, welding, surface treatment, degreasing, surface finishing, electroplating, etc.).
- Will any additional facilities (electricity generation, combustion processes, etc.) be constructed as part of the project?
- How is the project supplied with energy and raw materials?
- Please state the resources and energy consumption after the project's completion in accordance with the table below.

Resource and Energy Consumption			
Inputs per unit of product	**Mass Load Unit**	**Industry Benchmark**	**Project Value**
Energy			
Powder Metallurgy	GJ/t finished part	28-30	
Cold/Warm Extrusion	GJ/t finished part	40-42	
Hot Forging	GJ/t finished part	50	
Machining	GJ/t finished part	80	
Specific heat use – Steel Forging	MJ/ton/K	7	
Power consumption - Metal heating	kg//kWh	2,7-3,5	
Welding (joining 4mm steel plate)	kJ/m	500-2500	
Water			
Water consumption (Average per plant)	Ml/day	2-3	

Source: WORLD BANK/IFC EHS Guidelines for METAL, PLASTIC, AND RUBBER MANUFACTURING 2007, page 17

A.2. Air emissions

- Please state the expected maximum values for air emissions after the project's completion for all process steps in accordance with the table below. Occasionally, not all pollutants listed in the table are emitted or others specific to the project have to be added. Please inform us if that is the case.

Air Emission Levels for Metal Products Manufacturing			
Pollutants	**Units**	**Guideline Value**	**Project Value**
VOCs – surface cleaning	mg/Nm³	20-75[(1)]	
VOCs – metal and plastic coating	mg/Nm³	100 (up to 15 ton/y solvent consumption) 75 (more than 15 ton/y solvent consumption) 50 (drying processes)	
Volatile Halogenated Hydrocarbons – metal surface treatments	mg/Nm³	20	
Particulate Matter – metal surface treatments	mg/Nm³	5	
Hydrogen Chloride	mg/Nm³	10	
Nitrogen Oxides[(2)]	mg/Nm³	350	
Ammonia	mg/Nm³	50	
NOTES: 1. As 30 minute mean for contained sources. 20 mg/Nm3 for waste gases from surface cleaning using VOCs classified as carcinogenic, mutagenic or toxic to reproduction (risk phrases R45, R46, R49, R60, R61) with mass flow greater than or equal to 10 g/hour; and / or halogenated VOC classified with risk phrase R40 and having a mass flow greater than or equal to 100 g/hour); 75 mg/Nm3 for waste gases from other surface cleaning 2. Dry air at 11 percent O2			
Source: WORLD BANK/IFC EHS Guidelines for METAL, PLASTIC, AND RUBBER PRODUCTS MANUFACTURING 2007, page 16			

- Please also state the (expected) emission values (in particular greenhouse gas emissions (CO_2eq), dust (PM), sulfur dioxide (SO_2) and nitrogen oxides (NO_x) in mg/Nm³) for any steam and power generation. In the case of plants with a capacity of more than 50 $MW_{thermic}$ please use the questionnaire *Conventional Energy* as guideline.
- Please describe what measures are taken to avoid/reduce air emissions (including greenhouse gas emissions) from the site.
- What limit values for ambient air quality are applicable in the buyer's country (please make a table available)? Please state the relevant expected air emission levels. Please comment on changes in the ambient air quality before and after the project implementation. If there are no national limit values, please use the table below.

WHO Ambient Air Quality Guidelines[1,2]					
	Averaging Period	**IFC Guideline Value [µg/m³]**	**Guideline Value Host country**	**Project Value (baseline status) [µg/m³]**	**Project Value (after imple-mentation) [µg/m³]**
Sulfur dioxide (SO_2)	24-hour	125 (Interim target-1) 50 (Interim target-2) 20 (guideline)			
	10 minute	500 (guideline)			
Nitrogen dioxide (NO_2)	1-year	40 (guideline)			
	1-hour	200 (guideline)			
Particulate Matter (PM_{10})	1-year	70 (Interim target-1) 50 (Interim target-2) 30 (Interim target-3) 20 (guideline)			
	24-hour	150 (Interim target-1) 100 (Interim target-2) 75 (Interim target-3) 50 (guideline)			
Particulate Matter ($PM_{2.5}$)	1-year	35 (Interim target-1) 25 (Interim target-2) 15 (Interim target-3) 10 (guideline)			
	24-hour	75 (Interim target-1) 50 (Interim target-2) 37.5 (Interim target-3) 25 (guideline)			
Ozone	8-hour daily maximum	160 (Interim target-1) 100 (guideline)			

Notes:
[1] World Health Organization (WHO). Air Quality Guidelines Global Update, 2005. PM 24-hour value is the 99th percentile.
[2] Interim targets are provided in recognition of the need for a staged approach to achieving the recommended guidelines.

Source: WORLD BANK/IFC GENERAL EHS GUIDELINES 2007, page 4

- Please describe the on-site monitoring of air emissions as well as ambient air quality levels.

A.3. Fresh water and effluents

- How much (fresh) water is used on site? Is the water recirculated?

- Where and how is the water withdrawn?
- What wastewater streams are generated?
- How are effluents treated on site? Please also state whether effluents are discharged into a public sewage treatment system or into surface water bodies (river, lake, sea). If there are discharges, please provide information on the quantities of the wastewater streams (e.g. m³/h or l/s).
- If wastewater is discharged directly into a surface water body, please state the maximum values of the pollution levels in mg/l in accordance with the table below. Occasionally, not all pollutants listed in the table are emitted or others specific to the project have to be added. Please inform us if that is the case.

Effluent Levels for Metal, Plastic, and Rubber Products Manufacturing			
Pollutants	**Units**	**Guideline Value**	**Project Value**
pH	S.U.	6-9	
COD	mg/L	250	
TSS	mg/L	50 25 (electroplating)	
Oil and Grease	mg/L	10	
Aluminum	mg/L	3	
Arsenic	mg/L	0,1	
Cadmium	mg/L	0,1	
Chromium (total)	mg/L	0,5	
Chromium (hexavalent)	mg/L	0,1	
Copper	mg/L	0,5	
Iron	mg/L	3	
Lead	mg/L	0,2	
Mercury	mg/L	0,01	
Nickel	mg/L	0,5	
Silver	mg/L	0,2	
Tin	mg/L	2	
Zinc	mg/L	2	
Cyanides (total)	mg/L	1	
Cyanides (free)	mg/L	0,2	
Ammonia	mg/L	10 20 (electroplating)	
Fluorides	mg/L	20	
Phenols	mg/L	0,5	
Total Nitrogen	mg/L	15	
Total Phosphorus	mg/L	5	
Sulfide	mg/L	1	

Volatile Organic Halogens (VOX)	mg/L	0,1	
Toxicity	To be determined on a case specific basis		
Temperature increase	°C	<3[a]	
(a) At the edge of a scientifically established mixing zone which takes into account ambient water quality, receiving water use, potential receptors and assimilative capacity.			
Source: WORLD BANK/IFC EHS Guidelines for METAL, PLASTIC, AND RUBBER MANUFACTURING 2007, page 17			

- How and where are the effluents discharged? Please explicitly comment on a temperature rise at the point of discharge, describe possible effects of the discharge on the ecology of the water bodies and provide information on the condition and size of the water body (e.g. flow values, flow rate). Please give also details on protection measures.
- Please describe the measures planned to avoid/reduce/treat wastewater.
- Please describe the on-site monitoring of the effluent values.
- What national standards are applicable in the buyer's country for the discharge of sanitary sewage? How is sewage treated before it is discharged? Please state the expected maximum values of the pollution levels in the sewage. If there are no national limit values, please use the table below.

Indicative Values for Treated Sanitary Sewage Discharges[1]			
Pollutants	**Units**	**Guideline Value**	**Project Value**
pH	pH	6-9	
BOD	mg/L	30	
COD	mg/L	125	
Total nitrogen	mg/L	10	
Total phosphorus	mg/L	2	
Oil and grease	mg/L	10	
TSS	mg/L	50	
Total coliform bacteria	MPN[2]/100 ml	400[1]	
Notes: [1] Not applicable to centralized, municipal, wastewater treatment systems which are included in EHS Guidelines for Water and Sanitation. [2] MPN = Most Probable Number			
Source: WORLD BANK/IFC GENERAL EHS GUIDELINES 2007, page 30			

A.4. Waste

- What relevant waste products are generated on site?
- What measures are taken of avoid, treat and dispose of the waste (solid/liquid) generated and where/how is it deposited?
- Please give also details on possible waste incineration processes (type and quantity of waste, incineration temperature, etc.).

A.5. Noise

- Please state the noise impact (existing background noise level and additional noise emissions of the project) on the nearest receptors (industrial estates and residential areas) in dB(A) for day and night after completion of the project in accordance with the table below.

Noise Level Guidelines[1]				
	One Hour LA_{eq} (dBA)			
Receptor	**Guideline Value Daytime (07:00-22:00)**	**Project Value Daytime (07:00-22:00)**	**Guideline Value Nighttime (22:00-07:00)**	**Project Value Nighttime (22:00-07:00)**
Residential; institutional; educational[2]	55		45	
Industrial; commercial	70		70	
Notes: [1] Guidelines values are for noise levels measured out of doors. Source: Guidelines for Community Noise, WHO, 1999. [2] For acceptable indoor noise levels for residential, institutional, and educational settings refer to WHO (1999).				
Source: WORLD BANK/IFC GENERAL EHS GUIDELINES 2007, page 53				

- Do the project's noise emissions lead to an increase of the background noise level at the nearest receptors by more than 3 dB(A)?
- How far is the nearest residential area away?
- Are noise mitigation measures necessary or planned? If so, what measures?

A.6. Occupational health and safety

- What safety measures and/or control systems are planned to prevent accidents?
- How are safety and health (in particular with regard to physical hazards, fire and explosions, air quality and dermal exposure) guaranteed at the workplace?
- What average and maximum noise exposure is to be expected in the production? What safety measures are taken at workplaces where the noise exposure exceeds 85 dB(A)?
- Please make accident statistics for the past two years available to us.
- How are subcontractors integrated into the health and safety measures on site?

A.7. Health and safety of the population

- What measures are taken to minimize impacts and possible risks (noise, odours, explosions, dust and/or due to increased traffic) for adjacent communities?
- Please make information on infrastructure links (access roads, railway link, etc.), which may be necessary, available to us.

B. Plastic and rubber products manufacturing

B.1. Process and resources consumption

- Please give a technical description of the individual process steps (mixing, extrusion, thermoforming, etc.).
- Does petrochemical polymer production take place on site or do the raw materials undergo only physical thermal modification during the processing?
- Will any additional facilities (electricity generation, combustion processes, etc.) be constructed as part of the project?
- How is the project supplied with energy and raw materials?
- Please state the resources and energy consumption after the project's completion in accordance with the table below.

Resource and Energy Consumption			
Inputs per unit of product	**Mass Load Unit**	**Industry Benchmark**	**Project Value**
Plastic - Energy consumption			
Specific energy consumption (Plastics products)	kWh/kg	2,8-3,0	
Compounding	kWh/kg	0,6-1,0	
Extrusion and Blown Film	kWh/kg	1,0	
Injection & Blow Molding	kWh/kg	3,0	
Vacuum Thermoforming	kWh/kg	6,0-6,5	
Foams Extrusion	kWh/kg	0,3	
Rubber - Specific energy consumption			
Electrical	kWh/ton	750	
Thermal (Fuel)	Mcals/ton	1,25	
Water			
Water consumption (Average per plant)	Ml/day	2-3	
Source: WORLD BANK/IFC EHS Guidelines for METAL, PLASTIC, AND RUBBER MANUFACTURING 2007, page 17			

B.2. Air emissions

- Please state the expected maximum values for air emissions after the project's completion for all process steps in accordance with the table below. Occasionally, not all pollutants listed in the table are emitted or others specific to the project have to be added. Please inform us if that is the case.

Air Emission Levels for Metal, Plastic, and Rubber Products Manufacturing			
Pollutants	**Units**	**Guideline Value**	**Project Value**
VOCs – surface cleaning	mg/Nm³	20-75(1)	
VOCs – metal and plastic coating	mg/Nm³	100 (up to 15 ton/y solvent consumption) 75 (more than 15 ton/y solvent consumption) 50 (drying processes)	
VOCs – rubber conversion	mg/Nm³	20(2)	
TOC – rubber vulcanization	mg/Nm³	80	
Particulate Matter – metal surface treatments	mg/Nm³	5	
Particulate Matter – plastic processing	mg/Nm³	3	
Hydrogen Chloride	mg/Nm³	10	
Nitrogen Oxides(3)	mg/Nm³	350	
Ammonia	mg/Nm³	50	
NOTES: 1. As 30 minute mean for contained sources. 20 mg/Nm3 for waste gases from surface cleaning using VOCs classified as carcinogenic, mutagenic or toxic to reproduction (risk phrases R45, R46, R49, R60, R61) with mass flow greater than or equal to 10 g/hour; and / or halogenated VOC classified with risk phrase R40 and having a mass flow greater than or equal to 100 g/hour); 75 mg/Nm3 for waste gases from other surface cleaning 2. Facilities with solvent consumption greater than 15 tonnes/year 3. Dry air at 11 percent O2			
Source: WORLD BANK/IFC EHS Guidelines for METAL, PLASTIC, AND RUBBER MANUFACTURING 2007, page 16			

- Please also state the (expected) emission values (in particular greenhouse gas emissions (CO_2eq), dust (PM), sulfur dioxide (SO_2) and nitrogen oxides (NO_x) in mg/Nm³) for any steam and power generation. In the case of plants with a capacity of more than 50 $MW_{thermic}$ please use the questionnaire *Conventional Energy* as guideline.
- Please describe what measures are taken to avoid/reduce air emissions (including greenhouse gas emissions) from the site.
- What limit values for ambient air quality are applicable in the buyer's country (please make a table available)? Please state the relevant expected air emission levels. Please comment on changes in the ambient air quality before and after the project implementation. If there are no national limit values, please use the table below.

WHO Ambient Air Quality Guidelines[1,2]					
	Averaging Period	**IFC Guideline Value [µg/m³]**	**Guideline Value Host country**	**Project Value (baseline status) [µg/m³]**	**Project Value (after imple-mentation) [µg/m³]**
Sulfur dioxide (SO_2)	24-hour	125 (Interim target-1) 50 (Interim target-2) 20 (guideline)			
	10 minute	500 (guideline)			
Nitrogen dioxide (NO_2)	1-year	40 (guideline)			
	1-hour	200 (guideline)			
Particulate Matter (PM_{10})	1-year	70 (Interim target-1) 50 (Interim target-2) 30 (Interim target-3) 20 (guideline)			
	24-hour	150 (Interim target-1) 100 (Interim target-2) 75 (Interim target-3) 50 (guideline)			
Particulate Matter ($PM_{2.5}$)	1-year	35 (Interim target-1) 25 (Interim target-2) 15 (Interim target-3) 10 (guideline)			
	24-hour	75 (Interim target-1) 50 (Interim target-2) 37.5 (Interim target-3) 25 (guideline)			
Ozone	8-hour daily maximum	160 (Interim target-1) 100 (guideline)			

Notes:
[1] World Health Organization (WHO). Air Quality Guidelines Global Update, 2005. PM 24-hour value is the 99th percentile.
[2] Interim targets are provided in recognition of the need for a staged approach to achieving the recommended guidelines.

Source: WORLD BANK/IFC GENERAL EHS GUIDELINES 2007, page 4

- Please describe the on-site monitoring of air emissions as well as ambient air quality levels.

B.3. Fresh water and effluents

- How much (fresh) water is used on site? Is the water recirculated?
- Where and how is the water withdrawn?

- What wastewater streams are generated?
- How are effluents treated before they are discharged? Please also state whether effluents are discharged into a public sewage treatment system or into surface water bodies (river, lake, sea). If there are discharges, please provide information on the quantities of the wastewater streams (e.g. m³/h or l/s).
- If wastewater is discharged directly into a surface water body, please state the maximum values of the pollution levels in mg/l in accordance with the table below. Occasionally, not all pollutants listed in the table are emitted or others specific to the project have to be added. Please inform us if that is the case.

Effluent Levels for Metal, Plastic, and Rubber Products Manufacturing			
Pollutants	**Units**	**Guideline Value**	**Project Value**
pH	S.U.	6-9	
COD	mg/L	250	
TSS	mg/L	50	
Oil and Grease	mg/L	10	
Aluminum	mg/L	3	
Arsenic	mg/L	0,1	
Cadmium	mg/L	0,1	
Chromium (total)	mg/L	0,5	
Chromium (hexavalent)	mg/L	0,1	
Copper	mg/L	0,5	
Iron	mg/L	3	
Lead	mg/L	0,2	
Mercury	mg/L	0,01	
Nickel	mg/L	0,5	
Silver	mg/L	0,2	
Tin	mg/L	2	
Zinc	mg/L	2	
Cyanides (total)	mg/L	1	
Cyanides (free)	mg/L	0,2	
Ammonia	mg/L	10	
Fluorides	mg/L	20	
Phenols	mg/L	0,5	
Total Nitrogen	mg/L	15	
Total Phosphorus	mg/L	5	
Sulfide	mg/L	1	
Volatile Organic Halogens (VOX)	mg/L	0,1	
Toxicity	To be determined on a case specific basis		
Temperature increase	°C	<3[a]	
(a) At the edge of a scientifically established mixing zone which takes into account ambient water quality, receiving water use, potential receptors and assimilative capacity.			
Source: WORLD BANK/IFC EHS Guidelines for METAL, PLASTIC, AND RUBBER MANUFACTURING 2007, page 17			

- How and where are the effluents discharged? Please explicitly comment on a temperature rise at the point of discharge, describe possible effects of the discharge on the ecology of the water bodies and provide information on the condition and size of the water body (e.g. flow values, flow rate). Please give also details on protection measures.
- Please describe the measures planned to avoid/reduce/treat wastewater.

- Please describe the on-site monitoring of the effluent values.
- What national standards are applicable in the buyer's country for the discharge of sanitary sewage? How is sewage treated before it is discharged? Please state the expected maximum values of the pollution levels in the sewage. If there are no national limit values, please use the table below.

Indicative Values for Treated Sanitary Sewage Discharges[1]			
Pollutants	**Units**	**Guideline Value**	**Project Value**
pH	pH	6-9	
BOD	mg/L	30	
COD	mg/L	125	
Total nitrogen	mg/L	10	
Total phosphorus	mg/L	2	
Oil and grease	mg/L	10	
TSS	mg/L	50	
Total coliform bacteria	MPN[2]/100 ml	400[1]	
Notes: [1] Not applicable to centralized, municipal, wastewater treatment systems which are included in EHS Guidelines for Water and Sanitation. [2] MPN = Most Probable Number			
Source: WORLD BANK /IFC GENERAL EHS GUIDELINES 2007, page 30			

B.4. Waste

- What relevant waste products are generated on site (e.g. galvanic sludge)?
- What measures are taken to avoid, treat and dispose of the waste (solid/liquid) generated and where/how is it deposited?
- Please give also details on possible waste incineration processes (type and quantity of waste, incineration temperature, etc.).

B.5. Noise

- Please state the noise impact (existing background noise level and additional noise emissions of the project) on the nearest receptors (industrial estates and residential areas) in dB(A) for day and night after completion of the project in accordance with the table below.

Noise Level Guidelines[1]				
	One Hour LA_{eq} (dBA)			
Receptor	**Guideline Value Daytime (07:00-22:00)**	**Project Value Daytime (07:00-22:00)**	**Guideline Value Nighttime (22:00-07:00)**	**Project Value Nighttime (22:00-07:00)**
Residential; institutional; educational[2]	55		45	
Industrial; commercial	70		70	
Notes: [1] Guidelines values are for noise levels measured out of doors. Source: Guidelines for Community Noise, WHO, 1999. [2] For acceptable indoor noise levels for residential, institutional, and educational settings refer to WHO (1999).				
Source: WORLD BANK/IFC GENERAL EHS GUIDELINES 2007, page 53				

- Do the project's noise emissions lead to an increase of the background noise level at the nearest receptors by more than 3 dB(A)?
- How far is the nearest residential area away?
- Are noise mitigation measures necessary or planned? If so, what measures?

B.6. Occupational health and safety

- What safety measures and/or control systems are planned to prevent accidents?
- How are safety and health (in particular with regard to physical hazards, fire and explosions, air quality and dermal exposure) guaranteed at the workplace?
- What average and maximum noise exposure is to be expected in the production? What safety measures are taken at workplaces where the noise exposure exceeds 85 dB(A)?
- Please make accident statistics for the past two years available to us.
- How are subcontractors integrated into the health and safety measures on site?

B.7. Health and safety of the population

- What measures are taken to minimize impacts and possible risks (noise, explosions, dust and/or due to increased traffic) for adjacent communities?
- Please make information on infrastructure links (access roads, railway link, etc.), which may be necessary, available to us.

C. Electronics industry (including semiconductors)

C.1. Process and resources consumption

- Please give a technical description of the individual process steps.
- What substances (acids, leaches, solvents, varnishes, etc.) are used in this context?
- Please provide information on the storage and handling of hazardous substances.
- Will any additional facilities (electricity generation, combustion processes, etc.) be constructed as part of the project?
- How is the project supplied with energy and raw materials?
- Does the project involve the expansion of existing and/or the development of new quarries or mines? If so, please also answer the questions in the sector-related questionnaire *Mining*.
- Please state the resources and energy consumption after the project's completion in accordance with the table below.

Energy consumption			
Inputs per unit of product	**Unit**	**Industry Bench-mark**	**Project Value**
Energy total fab tools	kWh/cm² per wafer out	0,3 – 0,4	
Total fab support system		0,5 – 0,6	
Source: WORLD BANK/IFC EHS Guidelines for SEMICONDUCTORS AND OTHER ELECTRONICS MANUFACTURING 2007, page 11			

C.2. Air emissions

- Please state the expected maximum values for air emissions after the project's completion for all process steps in accordance with the table below. Occasionally, not all pollutants listed in the table are emitted or others specific to the project have to be added. Please inform us if that is the case.

Air emission levels [(c)]			
Pollutants	**Unit**	**Guideline Value**	**Project Value**
VOC [(a)]	mg/Nm³	20	
Organic HAP [(b)]	Ppmv	20	
Inorganic HAP [(b)]	Ppmv	0,42	
HCL	mg/Nm³	10	
HF	mg/Nm³	5	
Phosphine	mg/Nm³	0,5	
Arsine and As compounds	mg/Nm³	0,5	
Ammonia	mg/Nm³	30	
Acetone	mg/Nm³	150	
NOTES: a) Applicable to surface cleaning processes. b) Industry-specific hazardous air pollutants (HAPs) include: antimony compounds, arsenic compounds, arsine, carbon tetrachloride, catechol, chlorine, chromium compounds, ethyl acrilate, ethylbenzene, ethylene glycol, hydrochloric acid, hydrofluoric acid, lead compounds, methanol, methyl isobutyl ketone, methylene chloride, nickel compounds, perchloroethylene, phosphine, phosphorous, toluene, 1,1,1- trichloroethane, trichloroethylene (phased-out), xylenes. Current industry practice is not to use ethylbenzene, toluene, xylene, methylene chloride, carbon tetrachloride, chromium compounds, perchloroethylene, 1,1,1-trichloroethane, or trichloroethylene. c) At 3 percent O_2.			
Source: WORLD BANK/IFC EHS Guidelines for SEMICONDUCTORS AND OTHER ELECTRONICS MANUFACTURING 2007, page 10			

- Please also state the (expected) emission values (in particular greenhouse gas emissions (CO_2eq), dust (PM), sulfur dioxide (SO_2) and nitrogen oxides (NO_x) in mg/Nm³) for any steam and power generation. In the case of plants with a capacity of more than 50 $MW_{thermic}$ please use the questionnaire *Conventional Energy* as guideline.
- How high are the expected greenhouse gas emissions (CO_2) equivalents for scope 1+2 in tons/year?

- Please describe what measures are taken to avoid/reduce air emissions (including greenhouse gas emissions) from the site.

- What limit values for ambient air quality are applicable in the buyer's country (please make a table available)? Please state the relevant expected air emission levels. Please comment on changes in the ambient air quality before and after the project implementation. If there are no national limit values, please use the table below.

WHO Ambient Air Quality Guidelines[1,2]					
	Averaging Period	**IFC Guideline Value [µg/m³]**	**Guideline Value Host country**	**Project Value (baseline status) [µg/m³]**	**Project Value (after imple-mentation) [µg/m³]**
Sulfur dioxide (SO_2)	24-hour	125 (Interim target-1) 50 (Interim target-2) 20 (guideline)			
	10 minute	500 (guideline)			
Nitrogen dioxide (NO_2)	1-year	40 (guideline)			
	1-hour	200 (guideline)			
Particulate Matter (PM_{10})	1-year	70 (Interim target-1) 50 (Interim target-2) 30 (Interim target-3) 20 (guideline)			
	24-hour	150 (Interim target-1) 100 (Interim target-2) 75 (Interim target-3) 50 (guideline)			
Particulate Matter ($PM_{2.5}$)	1-year	35 (Interim target-1) 25 (Interim target-2) 15 (Interim target-3) 10 (guideline)			
	24-hour	75 (Interim target-1) 50 (Interim target-2) 37.5 (Interim target-3) 25 (guideline)			
Ozone	8-hour daily maximum	160 (Interim target-1) 100 (guideline)			

Notes:
[1] World Health Organization (WHO). Air Quality Guidelines Global Update, 2005. PM 24-hour value is the 99th percentile.
[2] Interim targets are provided in recognition of the need for a staged approach to achieving the recommended guidelines.

Source: WORLD BANK/IFC GENERAL EHS GUIDELINES 2007, page 4

- Please describe the on-site monitoring of air emissions as well as ambient air quality levels.

C.3. Fresh water and effluents

- How much (fresh) water is used on site? Is the water recirculated?
- Please state the water consumption after the project's completion in accordance with the table below.

Water consumption			
Inputs per unit of product	**Unit**	**Industry Bench-mark**	**Project Value**
Wet bench ultrapure water (UPW) use	l/300-mm wafer pass	42	
UPW consumption	l/200-mm wafer	4000 – 8000	
Net feed water use	l/cm²	8 – 10	
Fab UPW use	l/cm²	4 – 6	
Source: WORLD BANK/IFC EHS Guidelines for SEMICONDUCTORS AND OTHER ELECTRONICS MANUFACTURING 2007, page 11			

- Where and how is the water withdrawn?
- What wastewater streams are generated?
- How are effluents treated on site? Please also state whether effluents are discharged into a public sewage treatment system or into surface water bodies (river, lake, sea). If there are discharges, please provide information on the quantities of the wastewater streams (e.g. m³/h or l/s).
- If wastewater is discharged directly into a surface water body, please state the maximum values of the pollution levels in mg/l in accordance with the table below. Occasionally, not all pollutants listed in the table are emitted or others specific to the project have to be added. Please inform us if that is the case.

Effluent levels			
Pollutants	**Unit**	**Guideline Value**	**Project Value**
pH	-	6 – 9	
COD	mg/L	160	
BOD_5	mg/L	50	
Total Suspended Solids (TSS)	mg/L	50	
Oil and Grease	mg/L	10	
Total Phosphorus	mg/L	2	
Fluoride	mg/L	5	
Ammonia	mg/L	10	
Cyanide (total)	mg/L	1	
Cyanide (free)	mg/L	0,1	
Adsorbable Organicallybonded Halogens (AOX)	mg/L	0,5	
Arsenic	mg/L	0,1	
Chromium (hexavalent)	mg/L	0,1	
Chromium (total)	mg/L	0,5	
Cadmium	mg/L	0,1	
Copper	mg/L	0,5	
Lead	mg/L	0,1	
Mercury	mg/L	0,01	
Nickel	mg/L	0,5	
Tin	mg/L	2	

Silver	mg/L	0,1	
Selenium	mg/L	1	
Zinc	mg/L	2	
Temperature increase	°C	< 3 (a)	
a) At the edge of a scientifically established mixing zone which takes into account ambient water quality, receiving water use, potential receptors and assimilative capacity.			
Source: WORLD BANK/IFC EHS Guidelines for SEMICONDUCTORS AND OTHER ELECTRONICS MANUFACTURING 2007, page 10			

- How and where are the effluents discharged? Please explicitly comment on a temperature rise at the point of discharge, describe possible effects of the discharge on the ecology of the water bodies and provide information on the condition and size of the water body (e.g. flow values, flow rate). Please give also details on protection measures.
- Please describe the measures planned to avoid/reduce/treat wastewater.
- Please describe the on-site monitoring of the effluent values.
- What national standards are applicable in the buyer's country for the discharge of sanitary sewage? How is sewage treated before it is discharged? Please state the expected maximum values of the pollution levels in the sewage. If there are no national limit values, please use the table below.

Indicative Values for Treated Sanitary Sewage Discharges[1]			
Pollutants	**Units**	**Guideline Value**	**Project Value**
pH	pH	6-9	
BOD	mg/L	30	
COD	mg/L	125	
Total nitrogen	mg/L	10	
Total phosphorus	mg/L	2	
Oil and grease	mg/L	10	
TSS	mg/L	50	
Total coliform bacteria	MPN[2]/100 ml	400[1]	
Notes: [1] Not applicable to centralized, municipal, wastewater treatment systems which are included in EHS Guidelines for Water and Sanitation. [2] MPN = Most Probable Number			
Source: WORLD BANK/IFC GENERAL EHS GUIDELINES 2007, page 30			

C.4. Waste

- What relevant waste products are generated on site (e.g. used VE water, solvents, cleaning solutions, slurries from wastewater treatment, epoxy material and cyanide solutions)?
- What measures are taken to avoid, treat and dispose of the waste (solid/liquid) generated and where/how is it deposited?
- Please give also details on possible waste incineration processes (type and quantity of waste, incineration temperature, etc.).
- Please complete the table below with information on waste generation.

Waste generation			
Outputs per unit of product	**Unit**	**Industry Benchmark**	**Project Value**
Hazardous liquid waste recycle and reuse	%	80	
Solid waste recycle and reuse	%	85	
Source: WORLD BANK/IFC EHS Guidelines for SEMICONDUCTORS AND OTHER ELECTRONICS MANUFACTURING 2007, page 11			

C.5. Noise

- Please state the noise impact (existing background noise level and additional noise emissions of the project) on the nearest receptors (industrial estates and residential areas) in dB(A) for day and night after completion of the project in accordance with the table below.

Noise Level Guidelines[1]				
	One Hour LA_{eq} (dBA)			
Receptor	**Guideline Value Daytime (07:00-22:00)**	**Project Value Daytime (07:00-22:00)**	**Guideline Value Nighttime (22:00-07:00)**	**Project Value Nighttime (22:00-07:00)**
Residential; institutional; educational[2]	55		45	
Industrial; commercial	70		70	
Notes: [1] Guidelines values are for noise levels measured out of doors. Source: Guidelines for Community Noise, WHO, 1999. [2] For acceptable indoor noise levels for residential, institutional, and educational settings refer to WHO (1999).				
Source: WORLD BANK/IFC GENERAL EHS GUIDELINES 2007, page 53				

- Do the project's noise emissions lead to an increase of the background noise level at the nearest receptors by more than 3 dB(A)?
- How far is the nearest residential area away?
- Are noise mitigation measures necessary or planned? If so, what measures?

C.6. Occupational health and safety

- What safety measures and/or control systems are planned to prevent accidents?
- How are safety and health (in particular with regard to the risks related to exposure to substrates, hazardous substances, radiation sources and laser, physical hazards) guaranteed at the workplace?
- What average and maximum noise exposure is to be expected in the production? What safety measures are taken at workplaces where the noise exposure exceeds 85 dB(A)?
- Please make accident statistics for the past two years available to us.
- How are subcontractors integrated into the health and safety measures on site?

C.7. Health and safety of the population

- What measures are taken to minimize impacts and possible risks (noise, odours, explosions, dust and/or due to increased traffic) for adjacent communities?
- Please make information on infrastructure links (access roads, railway link, etc.), which may be necessary, available to us.

D. Additional informationen

Additional information on the **Common Approaches**, our **environmental, social and human rights due diligence** and the **applicable standards** can be found at:

https://agaportal.de/en/main-navigation/schnellzugriff-aga-konsortium/verantwortung

The **World Bank/IFC EHS Guidelines** can be found on the website:

http://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/ifc+sustainability/our+approach/risk+management/ehsguidelines.