



QUESTIONNAIRE FOR CONVENTIONAL ENERGY (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 and the EHS Guidelines for Thermal Power Plants. 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.

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- A. Fossil-fuel-based thermal power plants (page 2)**
- B. Rehabilitation and/or upgrading of existing thermal power plants (page 7)**
- C. Additional information (page 12)**

A. Fossil-fuel-based thermal power plants

A.1. Type of power plant

- What type of power plant is concerned (e.g. steam power plant, gas turbine power plant, combined cycle power plant (gas and steam turbine), combined heat and power plant, engine-driven power plant)?
- Please state the power plant's installed capacity (MW_{thermic} and MW_{electric}), output (kWh/a), energy conversion efficiency (%), average load percentage (%) and estimated operation period (years).

A.2. Fuels

- What fuels (also derived fuels or refuse derived fuels if applicable) are used? Please give details concerning the origin and quality of the fuels (sulfur content, calorific value, etc.). At what temperature are they burnt?
- If derived fuels are used, please give details concerning their type and composition, content of heavy metals, in particular of mercury (Hg), as well as the amount and type of plastics.
- How high is the fuel consumption per year (t/a)? Where multi-fuel firing is used, please itemize the consumption for all fuels used.
- How are the fuels delivered and stored? What safety measures are taken in this context?
- If there are open coal dumps/deposits: What measures are taken to avoid any environmental hazards caused by toxic substances (e.g. heavy metals) in leachate and coal pile runoff?

A.3. Emissions and ambient air quality

- Please state the maximum values for any waste gases that are emitted, including dust (PM), sulfur dioxide (SO_2) and nitrogen oxides (NO_x), in mg/Nm^3 and the reference oxygen content (%).
- Please inform us of the power plant's CO_2 emissions in gCO_2/kWh and in t/a.
- What measures to reduce emissions are generally in place (e.g. recirculation of liquids, denitrification, dust abatement, desulfurization)? Please give details.
- What dust abatement measures are taken (e.g. mono-cyclones, multi-cyclones, electrostatic or fabric filters)?
- How are SO_x emissions reduced (e.g. use of low-sulfur fuels, direct desulfurization in the combustion chamber, addition of lime (dry sorbent injection), flue gas desulfurization plant)?
- What measures are taken to reduce NO_x emissions (choice of fuel, flue gas recirculation, air grading, fuel staging, reduction of the combustion temperature or flue gas denitrification plant (selective catalytic reduction, or selective non-catalytic reduction)?
- What limit values for ambient air quality are applicable in the buyer's country (please make a table available)? Please state the relevant expected ambient air values. 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/m ³]	Guideline Value Host country	Project Value (baseline status) [µg/m ³]	Project Value (after implementation) [µg/m ³]
Sulfur dioxide (SO₂)	24-hour	125 (Interim target-1) 50 (Interim target-2) 20 (guideline)			
	10 minute	500 (guideline)			
Nitrogen dioxide (NO₂)	1-year	40 (guideline)			
	1-hour	200 (guideline)			
Particulate Matter (PM₁₀)	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: 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, p. 4					

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

A.4. Noise

- Are noise mitigation measures necessary or planned? If so, what measures?
- 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				
Receptor	One Hour LA _{eq} (dBA)			
	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, p. 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?

A.5. Fresh water and effluents

- How much (fresh) water is used for cooling and production? Is the water recirculated?
- Where and how is the water withdrawn?
- What wastewater streams will arise?
- How are process, drainage and cooling water 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 (table "Effluent Guidelines"). Occasionally, not all pollutants occur or pollutants must be added to the list depending on the project. Please inform us in such a case.

Effluent Guidelines

(To be applicable at relevant wastewater stream: e.g., from FGD system, wet ash transport, washing boiler/ air preheater and precipitator, boiler acid washing, regeneration of demineralizers and condensate polishers, oil-separated water, site drainage, coal pile runoff, and cooling water)

Separated water, site drainage, coal pile runoff, and cooling water)			
Parameter	Units	Guideline Value	Project Value
pH	S.U.	6-9	
Total Suspended Solids (TSS)	mg/L	50	
Oil and grease	mg/L	10	
Total residual chlorine	mg/L	0.2	
Chromium (total) (Cr)	mg/L	0.5	
Copper (Cu)	mg/L	0.5	
Iron (Fe)	mg/L	1.0	
Zinc (Zn)	mg/L	1.0	
Lead (Pb)	mg/L	0.5	
Cadmium (Cd)	mg/L	0.1	
Mercury (Hg)	mg/L	0.005	
Arsenic (As)	mg/L	0.5	
Temperature increase by thermal discharge from cooling system	<ul style="list-style-type: none">Site specific requirement to be established by the EA.Elevated temperature areas due to discharge of once-through cooling water (e.g., 1 Celsius above, 2 Celsius above, 3 Celsius above ambient water temperature) should be minimized by adjusting intake and outfall design through the project specific EA depending on the sensitive aquatic ecosystems around the discharge point.		
Note: Applicability of heavy metals should be determined in the EA. Guideline limits in the Table are from various references of effluent performance by thermal power plants.			
Source: WORLD BANK/IEC EHS Guidelines THERMAL POWER PLANTS 2008, p. 18			

- How and where are the effluents discharged? Please explicitly comment on a temperature rise at the point of discharge, describe possible effects of the discharges on the ecology of the water bodies and provide information on the condition and size of the water body (e.g. flow volumes, flow rates). Please give also details on protection measures.
- What national standards are applicable 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, p. 30			

A.6. Waste

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

A.7. 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 electromagnetic radiation, confined spaces, electrical hazards, fire and explosions, handling of toxic and hazardous substances, dust emissions, heat, noise) guaranteed at the work places?
- What average and maximum noise exposure is to be expected at the work places? What safety measures are taken at work places where the noise exposure exceeds 85 dB(A)?
- How are subcontractors integrated into health and safety measures on site?
- Please make accident statistics for the past two years available to us.

A.8. Health and safety of the population

- What measures are taken to minimize impacts and possible risks for adjacent communities, in particular with regard to the storage of chemicals and their transport, noise, smells, dust, traffic, sulfur and nitrogen emissions, fire and explosions?

B. Rehabilitation and/or upgrading of existing thermal power plants

B.1. Type of power plant

- What type of power plant is to undergo rehabilitation/upgrading (steam power plant, gas turbine power plant, combined cycle power plant (gas and steam turbine), combined heat and power plant, engine-driven power plant)?
- Please state the power plant's installed capacity ($\text{MW}_{\text{thermic}}$ and $\text{MW}_{\text{electric}}$), output (kWh/a), energy conversion efficiency (%), average load percentage (%) and estimated operation period (years).

B.2. Fuels

- What fuels (also derived fuels or refuse derived fuels if applicable) are used? Please give details concerning the origin and quality of the fuels (sulfur content, calorific value, etc.). At what temperature are they burnt?
- If derived fuels are used, please give details concerning their type and composition, content of heavy metals, in particular of mercury (Hg), as well as the amount and type of plastics.
- How high is the fuel consumption per year (t/a)? Where multi-fuel firing is used, please itemize the consumption for all fuels used.
- How are the fuels delivered and stored? What safety measures are taken in this context?
- If there are open coal dumps/depos: What measures are taken to avoid any environmental hazards caused by toxic substances (e.g. heavy metals) in leachate and coal pile runoff?

B.3. Nature and scope

- What does the rehabilitation and/or upgrading relate to?
- Does the rehabilitation/upgrading involve an increase in capacity? If so, how high will the capacity increase be?
- Does the rehabilitation and/or upgrading involve an extension of the site? If so, how large will the extension be?

B.4. Emissions and ambient air quality

- What limit values for ambient air quality are applicable in the buyer's country (please make a table available)? Please state the relevant expected ambient air values for emissions. 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}

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

- Please state the maximum values for any waste gases that are emitted, including dust (PM), sulfur dioxide (SO₂) and nitrogen oxides (NO_x), in mg/Nm³ and the reference oxygen content (%).
- Please state the power plant's CO₂ emissions before and after the upgrading both in t/a and in gCO₂/kWh.
- Will the values for other emissions (in particular PM, SO₂, NO_x) be reduced through the upgrading and/or rehabilitation? If so, please quantify the reduction of the emissions in absolute (t) and specific (per kWh) terms.
- What dust abatement measures are taken (e.g. mono-cyclones, multi-cyclones, electrostatic or fabric filters)?
- What measures to reduce emissions are generally in place (e.g. recirculation of liquids, denitrification, dust abatement, desulfurization)? Please give details.
- How are SO_x emissions reduced (e.g. use of low-sulfur fuels, direct desulfurization in the combustion chamber, addition of lime (dry sorbent injection), flue gas desulfurization plant)?
- What measures are taken to reduce NO_x emissions (choice of fuel, flue gas recirculation, air grading, fuel staging, reduction of the combustion temperature or flue gas denitrification plant (selective catalytic reduction, or selective non-catalytic reduction)?

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C. Additional Information

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.