**ENVIRONMENTAL IMPACT ASSESSMENT GUIDELINES FOR THE ENERGY SECTOR**

**Volume 1**

****

**Prepared by**

 **Environmental Protection Agency**

**under the**

 **Ghana Environmental Assessment Capacity Development Programme (GEACAP)**

**and**

**Ghana Environmental Assessment Support Programme (GEASP)**

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# FOREWORD

The Environmental Assessment Regulations, LI 1652, was promulgated in 1999 to give comprehensive legal cover to the Ghana Environmental Impact Assessment procedures. These Regulations require that all developmental activities likely to impact adversely on the environment must be subject to Environmental Assessment. The objective of the LI is to ensure that such development activities are carried out in an environmentally sound and sustainable manner. The requirements of the LI, however, place enormous responsibilities on all stakeholders involved in development in Ghana. The nature of the responsibilities varies for different stakeholders, depending on their statutory functions, areas of jurisdiction and interests such as policy makers, implementing or regulatory agencies, planning authorities, financial intermediaries or institutions providing training or consultants providing services in EIA.

A national Environmental Assessment Capacity Development Programme (GEACaP) was initiated in 2001 with financial assistance from the Netherlands Government. This was to assist all relevant institutions in meeting their respective obligations under the LI, and to promote sustainable development in Ghana. An important aspect of the programme was the development of Environmental Assessment Sector Specific Guidelines for eight sectors, namely; Transportation, Mining (revision), Tourism, General Construction & Services, Energy, Manufacturing, Agriculture and Health. Eight networks made up of representatives from relevant stakeholder institutions were formed to facilitate the development of the guidelines for these sectors. The key objectives of the Energy Sector Core Team included:

1. Defining the screening criteria for environmental assessment for energy sector investments.
2. Determining the scope of Environmental Impact Assessment (EIA) for the sector.
3. Providing systematic procedures on Environmental Impact Statement (EIS) preparations for the sector.
4. Providing guidelines on common potential impacts and mitigation measures.

The document is in two volumes, Volume One covers objective one. It defines Screening and elaborates on the criteria determining the assessment levels of undertakings. Volume Two covers Objectives 2 – 4.

The Netherlands Government financial support however ended prematurely in 2003. The Ministry of Energy in 2007 has provided funding for the completion of the energy sector guidelines.

**Mr. Jonathan Allotey**

**Executive Director, EPA**

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# ABBREVIATIONS AND ACRONYMS

|  |  |
| --- | --- |
| AER | Annual Environmental Report |
| CCA | Copper Chrome Arsenic |
| CFC | Chlorofluorocarbons |
| CHP | Combined Heat and Power |
| CNG / LNG  | Compressed Natural Gas / Liquefied Natural Gas |
| EAP | Environment Action Plan |
| EIA | Environmental Impact Assessment |
| EIS | Environmental Impact Statement |
| EMP / EMS | Environment Management Plan / Environmental Management System |
| EPA | Environmental Protection Agency |
| GHG | Greenhouse Gas |
| GEACaP | Ghana Environmental Assessment Capacity Development Programme |
| GWh | Gigawatt-hour (one million unit of electricity) |
| kWp / KVA | Kilowatt-peak / Kilovolt Ampere - |
| KWh | Kilowatt-hour (one unit of electricity) |
| LPG | Liquefied Petroleum Gas |
| MWp / MVA | Megawatt peak / Mega Volt Ampere |
| MWh | Megawatt-hour (thousand unit of electricity) |
| NG | Natural Gas |
| NOX / SOX  | Oxides of Nitrogen / Oxides of Sulphur |
| OTEC  | Ocean Thermal Energy Conversion |
| PCB | Polychlorinated Biphenyls |
| POP | Persistent Organic Pollutants |
| PEA / SEA | Preliminary Environmental Assessment / Strategic Environmental Assessment |
| ROW | Right of Way |

#  SCREENING

Screening is the process of determining whether or not a proposal will require environmental impact assessment and the level of assessment (also called schedule) to be carried out.

Environmental Assessment (EA) system in Ghana consists of three main assessment levels:

* Preliminary Environment Assessment (PEA).
* Environmental Impact Assessment (EIA).
* Strategic Environmental Assessment (SEA).

 Screening is the first step of the EA process.

Within 25 days of acknowledgement of receipt of a completed registration form of an undertaking, EPA must make a Screening decision.

The EPA’s decision in respect of a proposed undertaking could be one of the following:

1. No objection to the undertaking, i.e. undertaking is approved, no need for PEA, EIA or SEA.
2. Additional information required.
3. PEA required.
4. EIA required.
5. SEA required.
6. Objection to the Undertaking.

## SCREENING SCHEDULES

The Screening schedules have been grouped into FOUR categories:

Category A: This undertaking or development requires that the proponent fills out Form EA1. It suggests that the undertaking/development is unlikely to have significant[[1]](#footnote-2) negative environmental impacts. No Environmental Impact Assessment (EIA) is required.

Category B: This undertaking or development requires that the proponent carry out a Preliminary Environmental Assessment (PEA) after completing Form EA1, as the undertaking/development may have specific negative environmental impacts.

Category C: This undertaking or development requires that the proponent fill out Form EA2. It suggests that the undertaking/development is likely to have diverse and significant negative environmental impacts and for that matter EIA is mandatory.

Category D: Strategic Environmental Assessment (SEA). This is an environmental assessment process applied to national policies, plans and programmes by providing a framework within which some important matters such as cumulative effects, greenhouse gas policies, conservation of resources and issue of sustainability are at least partially taken into account. SEA is a two-stage EIA; the first is the over all environmental impact on the country whilst the second is a site-specific enquiry.

For grey areas, i.e. if one is unsure of a category or schedule of an undertaking after the initial registration, the following procedure is pursued:

1. Examine features of Undertaking regarding
* Technology
* Raw material type, quantities and sources
* Size, scale and output
* Waste type and characteristics.
1. Examine location/site characteristics regarding
* Site and neighbourhood survey
* Land use, cover type and zoning
* Resource in the area and uses
* Infrastructure and utilities.
1. Examine location and undertaking interaction regarding
* Health and safety
* Job creation and displacement
* Concerns of residents or existing establishments at or near the proposed site and the general public.
* Etc.

# POWER

## CATEGORY A: ONLY REGISTRATION REQUIRED

### **RENEWABLE ENERGY**

#### Wind Power Plants

* Wind farm equal or not exceeding one (1) hectare.
* Wind mast height between 10 metres and 20 metres inclusive, either for mounting of generator or measuring/recording sensors.
* Wind generator system of installed capacity equal or exceeding 500 kilowatt peak (kWp) single but less than 1000 kWp.
* All cases of retrofitting or upgrading as well as decommissioning of the stated or described plants.

#### Solar Thermal Power Plants

* Total solar collecting surface area not exceeding one (1) hectare. Either flat-plate, concentrators (parabolic trough, dish or mirrors), or chimney to generate process heat for drying (for instance crops) or transformation for electricity.
* Solar Water Heating system with total installed capacity equal or not exceeding 1000 litres of hot water generation in a single facility such as hotel, school, a health centre and capable of substituting for electric heating system.
* All cases of retrofitting or upgrading as well as decommissioning of the stated or described plants.

#### Solar Photovoltaic

* Central Solar Photovoltaic (PV) power plant/system equal or exceeding 10 kilowatt peak (kWp) but less than 500 kWp, either rooftop or ground mounted. Either stand-alone, hybrid or grid-tied.
* Ground mounted PV power plant/array not exceeding one (1) hectare.
* All cases of retrofitting or upgrading as well as decommissioning of the stated or described plants.

#### Micro - to Mini- Hydro power plants

* Construction of all Run-of-river micro- and pico- hydroelectric power plants.
* Construction of Run-of-river low-head mini-hydro electric plants without pondage with installed capacity not exceeding 500 kWp.
* All cases of retrofitting or upgrading as well as decommissioning of the stated or described plants.

#### Fuel Cell

* All industrial central fuel cell power plants of total installed capacity equal or exceeding 50 kVA but less than 100 kVA.
* All distributed fuel cell power units of total installed capacity equal or exceeding 50 kVA but less than 100 kVA.
* All cases of retrofitting or upgrading as well as decommissioning of the stated or described plants.

#### Biomass Power Plants and Plantations

* All biomass power plants more than 100 kVA but less than 500 kVA installed capacity using solid wastes as feedstock.
* All landfill power plants less between 100 kVA of installed capacity.
* All energy crop or forest plantations not exceeding 10 hectares.
* All cases of retrofitting, upgrading or expansion as well as decommissioning of the stated or described.

### **FOSSIL FUELS THERMAL PLANTS**

* Oil-fired (distillate oil including diesel) electric power plant with installed capacity equal or exceeding 500 kVA but less than 1000 kVA meant for back-up or main supply.
* LPG-fired electric power plant with installed capacity equal or exceeding 100 kVA but less than 200 kVA meant for back-up or main supply.
* Co-generation or Combined Heat and Power (CHP) plant with installed capacity equal or exceeding 500 kVA but less than 1000 kVA.
* All cases of retrofitting or upgrading as well as decommissioning of the stated or described plants.

### **TRANSMISSION LINES AND DISTRIBUTION SYSTEMS**

* Medium voltage lines, 11 kilovolt (kV) and 36 kV (voltage class) inclusive, not passing through environmentally sensitive areas (see Section 5).
* Applicable also to all cases of retrofitting or upgrading as well as decommissioning of the stated or described lines.
* Installation and operation of heavy-duty electrical transmission and distribution equipment and accessories, namely transformers, insulators, contactors, circuit breakers, etc.

###  **END-USE APPLIANCES AND EQUIPMENT AND HEAVY CONSUMERS**

* All commercial importers, manufacturers’ representatives of industrial plant and equipment such as electric motors, or equipment that are fitted with electric motor, electric heater, magnetizing devices, electric furnaces and kilns, electric boilers.
* All installations, industries and commercial/institutional establishments with power demand exceeding 200 kVA but less than 500 kVA. Applicable also to all cases of retrofitting or upgrading as well as decommissioning of the stated or described lines.
* All real-estate development with total power demand exceeding 200 kVA but less than 500 kVA. Applicable also to all cases of retrofitting or upgrading as well as decommissioning of the stated or described lines.
* Deployment of fifty thousand (50,000) but less than hundred thousand (100,000) pieces of compact fluorescent lamps (CFLs) within a period of a year. Specifically with safe disposal of dead CFLs containing heavy metals like mercury.

## CATEGORY B PEA REQUIRED

### **RENEWABLE ENERGY**

#### Wind Power Plants

* Wind farm between 1 and 20 hectares inclusive[[2]](#footnote-3).
* Wind mast exceeding 20 metre[[3]](#footnote-4) height.
* Wind generator system of installed capacity between one (1) and 15 MW(e) inclusive.
* Distributed Wind generator system of installed capacity equal or exceeding 500 kilowatt peak (kWp) cumulative but less than 1000 kWp.
* All cases of retrofitting or upgrading as well as decommissioning of the stated or described plants.

#### Solar Thermal Power Plants

* Total solar collecting surface area between 10 and 20 hectares inclusive. Either flat-plate, concentrators (parabolic trough, dish or mirrors), or chimney to generate process heat for drying (for instance crops) or transformation for electricity.
* Solar thermal power system, either concentrator or chimney with installed capacity between one (1) and 15 MW inclusive.
* All cases of retrofitting or upgrading as well as decommissioning of the stated or described plants.

#### Solar Photovoltaic

* Ground mounted PV power plant/system, either stand-alone, hybrid or grid-tied with total surface area of array exceeding one (1) hectare but below 20 hectares.
* Installation of central PV power system with installed capacity above 500 kWp.
* All distributed off-grid solar PV units popularly called solar home systems and of total capacity equal or more than 10 kWp within a radius of one kilometre (1 km).
* Deployment of stand-alone PV systems exceeding 100 units in a single community.
* Nationwide or large-scale deployment of storage batteries as part of stand-alone solar or wind power projects.
* All cases of retrofitting or upgrading as well as decommissioning of the stated or described plants.

#### Micro - to Small- Hydro power plants

* Construction of all pondage, storage and pumped storage, cascade pico-, micro- and mini- hydroelectric power plants with capacities below 1 MW peak.
* Construction of Run-of–river, low- to medium-head small hydroelectric plant with or without pondage, with or without cascade, with installed capacity between 500 kW (0.5 MW) and 15,000 kW (15 MW) inclusive.
* All cases of retrofitting or upgrading as well as decommissioning of the stated or described plants.

#### Fuel Cell

* All industrial central fuel cell power plants of total installed capacity equal or exceeding 100 kVA and where the hydrogen fuel is obtained from fossil fuel sources like coal, natural gas and petroleum products.
* All distributed fuel cell power units of total installed capacity equal or exceeding 100 kVA within 100 metre radius and where the hydrogen fuel is obtained from fossil fuel sources like natural gas and petroleum products.
* All cases of retrofitting or upgrading as well as decommissioning of the stated or described plants.

#### Biomass and Solid Waste

* Wood or sawdust fired electric power plants equal or exceeding 500 kVA but less than 15 MVA.
* Biogas fired electric power plants equal or exceeding 10 kVA but less than 100 kVA.
* Construction of all wastes (excluding old vehicular tyres[[4]](#footnote-5)) fired incinerators and power plants, either wood, municipal/urban solid or liquid waste with installed capacity not exceeding one (1) MW.
* All landfill power plants between 100 kVA and one (1) MVA inclusive.
* All energy crop plantations exceeding 10 hectares.
* All cases of retrofitting or upgrading as well as decommissioning of the stated or described plants.

#### Sea and other Water Power[[5]](#footnote-6)

* Wave, Tidal and Ocean Thermal Energy Conversion (OTEC).
* Energy from Salinity Gradients otherwise referred to as Solar Pond.
* All cases of retrofitting or upgrading as well as decommissioning of the stated or described plants.

### **FOSSIL FUELS THERMAL PLANTS**

* All coal -, coke- fired power plants or furnace with installed capacity equal or exceeding 100 kVA but less than 1000 kVA.
* Distributed or array of coal, or coke or both fired power plants within 100 metre radius with total installed capacity equal or exceeding 100 kVA but less than 1000 kVA or heat equivalent.
* Oil-fired (crude oil, diesel, fuel oil, etc) electric power plant with installed capacity between one (1) and 15 MVA inclusive.
* Distributed or array of oil-fired power plants within 100 metre radius with total installed capacity equal or exceeding one (1) MVA but less than 15 MVA.
* Combined Heat and Power (CHP) plant with minimum electrical output equal or exceeding one (1) MW but less than 15 MVA.
* Liquefied Petroleum Gas (LPG) fired electric power plant with installed capacity equal or exceeding 200 kVA but less than 500 kVA.
* Distributed or array of LPG power plants within 100 metre radius with total installed capacity equal or exceeding 200 kVA but less than 500 kVA.
* Natural gas fired electric power plant with installed capacity equal or exceeding 500 kVA but less than 1000 kVA.
* Distributed or array of natural gas fired power plants within 100 metre radius with total installed capacity equal or exceeding 500 kVA but less than 1000 kVA.
* All cases of retrofitting or upgrading as well as decommissioning of the stated or described plants.

### **TRANSMISSION LINES AND DISTRIBUTION SYSTEM**

* Medium to High voltage lines above 36 kV but below 70 kV voltage class, either underground or overhead. not passing through an environmentally sensitive area.
* Decommissioning of old transformers with specific reference to handling of polychlorinated bi-phenyl (PCB) additives in transformer oil.[[6]](#footnote-7)
* Storage, recycling and disposal of transformer oils.
* Storage and disposal of chemically treated wooden poles with specific reference to the use of Copper Chrome Arsenic (CCA).
* Construction and installation of substations equal and above one (1) MVA in the transmission and distribution networks.
* Applicable also to all cases of retrofitting or upgrading as well as decommissioning of the stated or described systems and networks.

###  **END-USE APPLIANCES AND EQUIPMENT AND HEAVY CONSUMERS**

* Deployment of National or large-scale deployment of any electrical appliances or devices such as CFLs, LED lamps, refrigerators exceeding 100,000 units.

## CATEGORY C EIA IS MANDATORY

### **RENEWABLE ENERGY**

#### Wind Power Plants

* All off- shore installations for wind power or farm.
* All wind farms exceeding 20 hectares.
* Wind farm exceeding a total installed capacity of 15 MW(e).
* Applicable also to all cases of retrofitting or upgrading as well as decommissioning of the stated or described plants.

#### Solar Thermal Power Plants

* Solar thermal plants of installed capacity exceeding 15 MW(e).
* Solar thermal plants of land size exceeding 20 hectares.
* Applicable also to all cases of retrofitting or upgrading as well as decommissioning of the stated or described plants.

#### Solar Photovoltaic

Ground mounted PV power plant/system, either stand-alone, hybrid or grid-tied with total surface area of array exceeding 20 hectares. Retrofitting, upgrading, expansion as well as decommissioning included.

#### Biomass and Solid Wastes[[7]](#footnote-8)

* Wood or sawdust fired electric power plants exceeding 15 MW(e).
* Biogas fired electric power plants exceeding 100 kVA.
* Construction of all waste fired incinerators and power plants, either municipal/urban solid or liquid waste with installed capacity exceeding 1 MW(e).
* Construction of all anaerobic waste power plants, either bacteria induced or enhanced, exceeding 1 MW(e).
* Construction of waste fired power plants using old vehicular tyres as feedstock with installed capacity exceeding 500 kVA.
* Construction of landfill plants exceeding 1 MW(e).
* Applicable also to all cases of retrofitting or upgrading as well as decommissioning of the stated or described plants.

### **HYDRO POWER PLANTS**

* Construction of pondage, storage and pumped storage, diversion canal small- hydroelectric power plants with installed capacity exceeding 1 MW.
* Construction of medium to large hydro dams of installed capacity exceeding 15 MW.
* Applicable also to all cases of retrofitting or upgrading as well as decommissioning of the stated or described plants.

### **FOSSIL FUEL THERMAL PLANTS**

* All coal power plants, including coal solid; gasification and liquefaction generation plants with installed capacity equal or exceeding one (1) MVA.
* All coke fired power plants with installed capacity equal or exceeding one (1) MVA.
* All oil fired power plants with installed capacity equal or exceeding 15 MVA.
* Distributed or array of oil-fired power plants within 100 metre radius with total installed capacity equal or exceeding 15 MVA.
* All natural gas fired gas turbine power plants with installed capacity exceeding 500 kVA.
* Combined Heat and Power (CHP) plant with minimum electrical output equal or exceeding 15 MVA.
* Liquefied Petroleum Gas (LPG) fired electric power plant with installed capacity equal or exceeding 500 kVA.
* Distributed or array of LPG power plants within 100 metre radius with total installed capacity equal or exceeding 500 kVA.
* Natural gas fired electric power plant with installed capacity equal or exceeding 500 kVA.
* Distributed or array of natural gas power plants within 100 metre radius with total installed capacity equal or exceeding 500 kVA.
* Applicable also to all cases of retrofitting or upgrading as well as decommissioning of the stated or described plants.
* Construction of peat-fired generating plants exceeding 1 MW(e).

### **NUCLEAR POWER PLANTS**

Construction of all nuclear fuelled power plants including retrofitting, upgrading as well as decommissioning. .

Construction and upgrading of research reactors of power rating exceeding 500 kW(e)[[8]](#footnote-9) including decommissioning.

### **TRANSMISSION LINES**

High voltage transmission lines, either HVDC (High Voltage Direct Current) or HVAC (High Voltage Alternating Current), either overhead or underground, equal or exceeding 70 kV class. Retrofitting, upgrading as well as decommissioning included.

## CATEGORY D STRATEGIC EA REQUIRED

National, Energy Policy, Plans and Programmes.

# LIQUID AND GASEOUS FUELS

## CATEGORY A ONLY REGISTRATION REQUIRED

### **PETROLEUM PRODUCTS**

* Strictly kerosene-retailing outlet of installed surface tank capacity exceeding 5000 litres located in rural and remote areas. Tank must be on the surface and not buried or underground.
* Commercial vehicular transporters of all petroleum fuels, LPG, CNG and LNG.
* Applicable also to all cases of retrofitting or upgrading as well as decommissioning.

### **FUEL CONSUMING EQUIPMENT AND OPERATORS**

* Installation and operation of commercial boilers and kilns.
* Construction or installation of industrial and commercial equipment with minimum fuel (distillate oil, etc) consumption exceeding 1000 litres per day or with its equivalent in LPG, NG, CNG or LNG. (Upgrading and decommissioning included.)
* Industrial and commercial/institutional facilities using natural gas for heating or for electricity. Upgrading and decommissioning included.

### **RENEWABLE SOURCES OF ENERGY**

Cultivation of dedicated plantations for energy such as jatropha, sugarcane, oil palm, coconut, either homogenous or mix-cropping, with area coverage less than 10 hectares purposely for production or use as liquid biofuel - biodiesel. Expansion and decommissioning included.

## CATEGORY B PEA REQUIRED

### **PETROLEUM PRODUCTS**

* Construction of petroleum product retail outlets: - Service stations, Filling stations, Reselling outlets, LPG filling Plants, Kerosene retail outlet with surface tank capacity exceeding 10,000 litres.[[9]](#footnote-10)
* Construction of petroleum product depots for the storage of gasoline, gas or diesel located outside 3 kilometres of any residential, commercial and industrial areas.
* Operation of commercial mobile (vehicular) LPG filling plants or trucks exceeding 5 tonnes (or tons) gross vehicular weight.
* Applicable also to all cases of retrofitting or upgrading as well as decommissioning.

### **RENEWABLE SOURCES OF ENERGY**

* Cultivation of Jatropha crop plantation with area coverage exceeding 10 hectares purposely for use as liquid biofuel - biodiesel.
* Cultivation of dedicated energy crop plantation with area coverage exceeding 10 hectares for production of ethanol and methanol for use as liquid biofuels; blending with petroleum products.
* Construction of liquid biofuel (biodiesel, alcohol, blends, etc) processing and refining plants.
* Applicable also to all cases of retrofitting or upgrading as well as decommissioning.

## CATEGORY C EIA IS MANDATORY

* Construction of national gas distribution pipeline network.
* Construction of natural gas distribution and retail outlets either compressed (CNG) or liquefied. (LNG).
* Development of off shore/ on shore oil and gas fields.
* Development of shale oil and tar sand fields.
* Construction of Off shore/ On shore oil and gas pipelines.
* Construction of Petroleum Refineries.
* Refinery facility for coal gasification and liquefaction to produce gas and liquid fuels.
* Construction of crude oil storage depots.
* Construction of petroleum product depots for bulk storage of gasoline, gas or diesel located within 3 kilometres of any residential, commercial and industrial areas.
* Applicable also to all cases of retrofitting or upgrading as well as decommissioning.

## CATEGORY D STRATEGIC EA REQUIRED

National, Energy Policy, Plans and Programmes.

# TRADITIONAL BIOMASS AND OTHER ENERGY SOURCES

## CATEGORY A ONLY REGISTRATION REQUIRED

* All commercial scale traditional charcoal producers using any form of kiln, i.e. earth mound, sawdust-mound kilns, improved kiln, either brick or metal.
* All wholesale suppliers, distributors, and transporters of charcoal or, traders whose role could be deemed as middlemen in the wholesale supply, transportation or distribution of charcoal in the woodfuel business.
* Construction of solar distillation and or desalination plants for potable water with total array or land size not exceeding one (1) hectare, including decommissioning.
* Applicable also to all cases of retrofitting or upgrading as well as decommissioning.

## CATEGORY B PEA REQUIRED

* All commercial scale charcoal producers using any form of improved kiln, either brick or metal and with relatively permanent harvesting site and with business plans for export in the near future.
* Construction of solar distillation and or desalination plants with total array or land size exceeding one (1) hectare.
* Applicable also to all cases of retrofitting or upgrading as well as decommissioning.

## CATEGORY D STRATEGIC EA REQUIRED

National, Energy Policy, Plans and Programmes.

# MATRICES

## POWER MATRIX

|  |  |  |
| --- | --- | --- |
| **ACTIVITY** | **THRESHOLD** | **LEVEL OF ASSESSMENT** |
| **RENEWABLES (Applicable also to retrofitting/upgrading or decommissioning)** |
| **Wind** | * Farm size below 1 hectare
* Wind mast 10 - 20 metre height
* Installed capacity 500 – 1000 kWp
 | Registration |
|  | * Farm size 1 and 20 hectares
* Wind mast exceeding 20 metre height
* Installed capacity 1 – 15 MW (e)
 | PEA |
|  | * Farm size exceeding 20 hectares
* Installed capacity exceeding 15 MW (e)
* Off-shore wind farm
 | EIA |
| **Solar thermal** | * Total solar collecting surface area below 1 hectare.
* Solar Water Heating system with total installed capacity equal or exceeding 1000 litres of hot water .
 | Registration |
|  | * Total solar collecting surface area 1 and 20 hectares.
* Installed capacity 1 - 15 MW.
 | PEA |
|  | * Solar thermal plants of land size exceeding 20 hectares
* Solar thermal plants of installed capacity exceeding 15 MW(e).
 | EIA |
| **Micro – to Small Hydro**  | * Run-of-river micro- and pico- hydroelectric power plants.
* Run-of-river with installed capacity below 500 kWp.
 | Registration |
|  | * Pondage, storage and pumped storage, cascade with capacities below 1 MW.
* Run-of–river, installed capacity 0.5 - 15 MW.
 | PEA |

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| **ACTIVITY** | **THRESHOLD** | **LEVEL OF ASSESSMENT** |
| **Micro – to Small Hydro** | * Pondage, storage and pumped storage, diversion canal with installed capacity exceeding 1 MW.
* Medium to large hydro of installed capacity exceeding 15 MW.
 | EIA |
| **Solar Photovoltaic** | * Central power plant/system 10 kWp but less than 500 kWp,
* Ground mounted PV power plant/system not exceeding one (1) hectare.
 | Registration |
|  | * Distributed off-grid solar units of total capacity equal or more than 10 kWp within a radius of one kilometre (1 km) or in a single community.
* Ground mounted PV power plant/system, with total surface area of array exceeding 1 hectare but below 20 hectares.
* Central system with installed capacity above 500 kWp.
 | PEA |
|  | Ground mounted of total area of array exceeding 20 hectares. | EIA |
| **Fuel Cell**  | * Industrial central power plants of total installed capacity equal or exceeding 50 kVA but less than 100 kVA.
* Distributed units of total installed capacity equal or exceeding 50 kVA but less than 100 kVA.
 | Registration |
|  | * Industrial central plants of total installed capacity equal or exceeding 100 kVA and where the hydrogen fuel is obtained from fossil fuel sources.
* Distributed units of total installed capacity equal or exceeding 100 kVA within 100 metre radius and where the hydrogen fuel is obtained from fossil fuel sources.
 | PEA |

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| **ACTIVITY** | **THRESHOLD** | **LEVEL OF ASSESSMENT** |
| **Biomass and Wastes** | * Energy crop or forest plantations not exceeding 10 hectares.
* Biomass power plants more than 100 kVA but less than 500 kVA installed capacity using biomass solid wastes as feedstock.
* All landfill power plants less between 100 kVA of installed capacity.
 | Registration |
| * Energy crop or forest plantations exceeding 10 hectares.
* Wood or sawdust fired plants equal or exceeding 500 kVA but less than 15 MVA.
* Biogas fired electric plants equal or exceeding 10 kVA but less than 100 kVA.
 | PEA |
| * Wastes (excluding old vehicular tyres) fired incinerators and power plants with installed capacity not exceeding 1 MW.
* All landfill power plants 100 kVA - 1 MVA.
 | PEA |
| * Wood or sawdust fired electric power plants exceeding 15 MW(e).
* Biogas fired electric power plants equal or exceeding 100 kVA.
* Waste fired power plants with installed capacity exceeding 1 MW(e).
* Anaerobic waste power plants, either bacteria induced or enhanced, exceeding 1 MW(e).
* Waste fired power plants using old vehicular tyres as feedstock with installed capacity exceeding 500 kVA.
* Landfill plants exceeding 1 MW(e).
* Peat-fired plants exceeding 1 MW(e).
 | EIA |

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| **ACTIVITY** | **THRESHOLD** | **LEVEL OF ASSESSMENT** |
| **FOSSIL FUELS (Applicable also to retrofitting/upgrading or decommissioning)** |
| **Fossil Fuels** | * Oil-fired plant with installed capacity equal or exceeding 500 kVA but less than 1000 kVA.
* LPG-fired plant with installed capacity equal or exceeding 100 kVA but less than 500 kVA.
* CHP plant with installed capacity equal or exceeding 500 kVA but less than 1000 kVA.
 | Registration |
|  | * Coal and coke- fired plants with installed capacity less than 1000kVA.
* Distributed coal, or coke plants within 100 metre radius with total installed capacity less than 1000 kVA.
* Oil-fired plant with installed capacity 1 - 15 MVA.
* Distributed oil-fired plants within 100 metre radius with total installed capacity equal or exceeding 1MVA but less than 15 MVA.
* CHP plant with minimum electrical output equal or exceeding 1 MW but less than 15 MVA.
* LPG fired plant with installed capacity equal or exceeding 200 kVA but less than 500 kVA.
* Distributed LPG plants within 200 metre radius with total installed capacity equal or exceeding 500kVA but less than 1000kVA.
* Natural gas fired plant with installed capacity equal or exceeding 500 kVA but less than 1000 kVA.
* Distributed natural gas power plants within 100 metre radius with total installed capacity equal or exceeding 100 kVA but less than 500 kVA.
 | PEA |
| **Fossil Fuels** | * Direct and indirect coal based power plants, with installed

capacity equal or exceeding 1 MVA. * Coke fired power plants with installed capacity equal or exceeding 1 MVA.
* Oil fired power plants with installed capacity equal or exceeding 15 MVA.
* Distributed oil-fired power plants within 100 metre radius with total installed capacity equal or exceeding 15 MVA.
* Natural gas fired gas turbine power plants with installed capacity exceeding 500 kVA.
* CHP plant with minimum electrical output equal or exceeding 15 MVA.
* LPG fired plant with installed capacity equal or exceeding 500 kVA.
* Distributed LPG power plants within 100 metre radius with total installed capacity equal or exceeding 500 kVA.
* Natural gas fired electric power plant with installed capacity equal or exceeding 500 kVA.
* Distributed natural gas power plants within 100 metre radius with total installed capacity equal or exceeding 500 kVA.
 | EIA |
| **NUCLEAR** |
| **Nuclear** | All categories of nuclear power plants (including retrofitting / upgrading and decommissioning) | EIA |

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| **ACTIVITY** | **THRESHOLD** | **LEVEL OF ASSESSMENT** |
| **TRANSMISSION LINES AND DISTRIBUTION SYSTEM (Applicable also to retrofitting/upgrading or decommissioning)** |
| **Transmission / distribution lines** | * 11 - 33 kV.
* For overhead lines, Right of way should include all area lying at least 10 metres on either side of the centre line of the power lines.
* Construction and installation of substations equal and above one (1) MVA in the transmission and distribution networks.
 | Registration |
|  | * Above 33 kV but below 66 kV,
* For overhead lines, the right of way should include all areas lying at least 15 metres but not exceeding 60 metres wide on either side of the centre line of the power lines.
 | PEA |
|  | * High voltage transmission lines equal or exceeding 66 kV.
* For overhead lines, the right-of-way should not exceed a total width of 120 metres.
 | EIA |
| **Distribution system** | All commercial dealers, importers and manufacturers of heavy-duty electrical distribution equipment and accessories | Registration |
| **Management of used Transformer oils** | * Decommissioning of old transformers with specific reference to handling of polychlorinated bi-phenyl (PCB) additives in transformer oil.[[10]](#footnote-11)
* Storage, recycling and disposal of transformer oils.
* Storage and disposal of chemically treated wooden poles with specific reference to the use of Copper Chrome Arsenic (CCA).
 | PEA |

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| **ACTIVITY** | **THRESHOLD** | **LEVEL OF ASSESSMENT** |
| **END-USE APPLIANCES AND EQUIPMENT AND HEAVY CONSUMERS** |
|  | * Commercial importers, manufacturers’ representatives of industrial plant and equipment such as electric motors, or equipment that are fitted with electric motor, electric heater, magnetizing devices, electric furnaces and kilns, electric boilers.
* All installations, industries and commercial/institutional establishments with power demand exceeding 200 kVA but less than 500 kVA.
* All real-estate development with total power demand exceeding 200 kVA but less than 500 kVA.
 | Registration |
|  | National or large-scale CFLs, more than 50,000 units but less than 100,000 units. |  |
|  | National or large-scale deployment of any electrical appliances or devices such as CFLs, LED lamps, refrigerators exceeding 100,000 units.  | PEA |
|  | All industrial, commercial and building facilities whose peak power demand exceed 500 kVA but not more than one (1) MVA. |
|  | All industrial, commercial and building facilities whose peak power demand exceed one (1) MVA. . | EIA |

## HYDROCARBON AND LIQUID BIOFUEL MATRIX

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| **ACTIVITY** | **THRESHOLD** | **LEVEL OF ASSESSMENT** |
| **PETROLEUM PRODUCTS (Applicable also to retrofitting/upgrading or decommissioning)** |
| **Kerosene retailing outlet** | Rural or remote areas, restricted only to surface tank of installed capacity exceeding 5000 litres. | Registration |
|  | Surface tank capacity exceeding 10,000 litres | PEA |
| **Commercial mobile (vehicular) filling plants**  | Commercial vehicular transporters of all petroleum fuels, LPG, CNG and LNG.  | Registration |
|  | Mobile Trucks exceeding 5 tonnes gross vehicular weight. | PEA |
| **Retail outlets*** Service stations,
* Filling stations,
* Reselling outlets,
* LPG fixed Plants,
 | * + Fence wall should be at least 2 metres high. Except for LPG filling stations, front / entrance fence wall could be less than 2 metres high or open.
	+ Fence wall should be least 20 metres from the nearest dwelling in residential area and at least 5 metres from the nearest dwelling in industrial and commercial areas.
	+ Vent pipe should at least be 15 metres away from naked fire.
	+ Vent pipe should be situated within fence wall at least

25 metres from fence wall;45 metres from the nearest dwelling in residential area;30 metres from the nearest dwelling in industrial and commercial areas. |  |
| **Fuel saving devices**  | National or large-scale deployment of any fuel saving or efficiency devices for vehicles exceeding 100,000 units. |  |

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| **ACTIVITY** | **THRESHOLD** | **LEVEL OF ASSESSMENT** |
| **FUEL CONSUMING EQUIPMENT** |
|  | * All commercial dealers in boilers and kilns.
* Industrial and commercial equipment with minimum fuel (distillate oil, etc) consumption exceeding 1000 litres per day or with its equivalent in LPG, NG, CNG or LNG.
 | Registration |
| **CONSTRUCTION AND FIELD DEVELOPMENT (Applicable also to retrofitting/upgrading or decommissioning)** |
| **Natural gas distribution pipelines and retail outlets** | No limit | EIA |
| **Off shore/ On shore oil and gas fields** | No limit | EIA |
| **Shale oil and tar sand fields** | No limit | EIA |
| **Off shore/ On shore oil and gas pipelines** | No limit | EIA |
| **Petroleum Refineries** | No limit | EIA |
| **Crude oil storage depots** | No limit | EIA |
| **Petroleum product depots for bulk storage** | Located outside 3 kilometres of any residential, commercial and industrial areas | PEA |
|  | Located within 3 kilometres of any residential, commercial and industrial areas | EIA |
| **Refinery facility for coal gasification and liquefaction** | No limit | EIA |

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| **ACTIVITY** | **THRESHOLD** | **LEVEL OF ASSESSMENT** |
| **RENEWABLE SOURCES OF ENERGY (Applicable also to retrofitting/upgrading or decommissioning)** |
|  | Cultivation of Jatropha or sugarcane plantation with area coverage less than 10 hectares purposely for production or use as biodiesel or gasohol blends respectively. | Registration |
| Cultivation of any dedicated energy crop plantation either mono-cropping or mix-cropping, with area coverage exceeding 10 hectares for production of biodiesel, ethanol and methanol for use as liquid biofuels; blending with petroleum products. | PEA |
| Construction of liquid biofuel (biodiesel, alcohol, blends, etc) processing and refining plants.  |

## TRADITIONAL BIOMASS AND OTHER FUEL MATRIX

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| **ACTIVITY** | **THRESHOLD** | **LEVEL OF ASSESSMENT** |
| **CHARCOAL** |
| **Commercial Producers** | Using any form of kiln, i.e. earth mound, sawdust-mound kilns, improved kiln, either brick or metal | Registration |
| **Wholesale transporters and suppliers** | No limit  |
| **Exporters** | No limit  | PEA |
| **SOLAR DISTILLATION AND OR DESALINATION PLANTS**  | Land area or array size not exceeding one (1) hectare (Applicable also to upgrading /retrofitting and decommissioning) | Registration |
|  | Land area or array size exceeding 1 hectares(Applicable also to upgrading /retrofitting and decommissioning) | PEA |

# ENVIRONMENTALLY SENSITIVE AREAS

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| **Description of sensitive areas** |

1. All areas declared by law as Wildlife Conservation area
2. Areas which constitute the natural habitat(s) of any threatened (endangered, data deficient and vulnerable), rare, endemic flora and fauna
3. All known historical, cultural, archeological and scientific sites that are of public interest
4. Areas known to be prone to natural environmental disturbance including coastal erosion, flooding, geological hazards (earthquake, tremor, landslide) and radioactive emissions
5. Hilly areas with gradient above 45 degrees and prone to erosion or rock fall or mudslide or landslide.
6. Areas (of land) adjoining water bodies of minimum distance 50 meters away from the bank of the water body
7. Water bodies characterized by one or more of the following conditions:

 a) used for domestic purposes,

 b) water within controlled/ protected areas,

 c) supports wildlife and fish,

 d) head waters.

1. Mangrove area characterized by one or more of the following conditions:

 a) adjoining mouth/estuary of a river/stream system;

 b) habitat for wildlife;

 c) spawning ground for fish;

 d) near or adjacent to traditional fishing ground;

 e) acting as natural buffer against shore erosion, strong winds or for storm floods

1. The concept of ‘significance’ is subjective since it has not been defined by any international forum or grouping. To arrive at a fair assessment, it is up to the proponent to provide as much information as possible based upon the EIA checklist and guidelines. Significance is thus in the end, a collective professional judgement of the experienced vetting committee based upon the information made available. [↑](#footnote-ref-2)
2. The Mining sector and the Forest & Wood Industries sector require EIS if the area to be worked on exceeds 10 and 20 hectares respectively. [↑](#footnote-ref-3)
3. Department of Town and Country Planning requires EIS for structures of height 20 metres or more. [↑](#footnote-ref-4)
4. See Section 3.3.1.4 [↑](#footnote-ref-5)
5. Even though, the potential resource of the country is not known, large-scale power stations have started to emerge elsewhere in the world since mid 1990s. *Mandatory EIA is required should there be a commercial development in the nearest future:* [↑](#footnote-ref-6)
6. PCB even though, useful fire-retardant additive is a persistent organic pollutant (POP). Ghana is a signatory to the Stockholm Convention on POPs, a UNEP convention banning or restricting worldwide use of POPs (May 21 – 23, 2001). UNEP is United Nations Environment Program. [↑](#footnote-ref-7)
7. All wastes plants must employ a form of cleaning (scrubbing) technology with emphasis on reducing emissions of oxides of nitrogen and sulphur, carbon monoxides, dioxins and other potential carcinogenic substances to acceptable minimal levels (Refer to Appendix…) [↑](#footnote-ref-8)
8. In order not to inhibit the research drive and capacity of Ghana Atomic Energy Commission, reactors of power rating below 500 kWp are being left in their discretion. [↑](#footnote-ref-9)
9. Fence wall should be at least 2 metres high and should be least 20 metres from the nearest dwelling in residential area and at least 5 metres from the nearest dwelling in industrial and commercial areas.

Vent pipe should at least be 15 metres away from naked fire. Also, Vent pipe should be situated within fence wall at least 1 metre from fence wall. [↑](#footnote-ref-10)
10. PCB even though, useful fire-retardant additive is a persistent organic pollutant (POP). Ghana is a signatory to the Stockholm Convention on POPs, a UNEP convention banning or restricting worldwide use of POPs (May 21 – 23, 2001). UNEP is United Nations Environment Program. [↑](#footnote-ref-11)