



AES Jordan

Biodiversity Assessment & Protection Procedure

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1.0 Purpose

The purpose of this AES Biodiversity Assessment & Protection procedure is to set: 1) an annual requirement for AES Levant to assess and communicate to the AES Global EHS & Security team any ongoing Biodiversity management activities, and 2) a requirement for AES Levant to notify the AES Global EHS & Security team of any future business actions potentially impacting Biodiversity.

A key objective of this procedure is to ensure that AES Levant identify, assess, document and take proper mitigation action on Biodiversity matters prior to engaging in any activity so as to completely avoid or, if avoidance is not possible, to minimize negative Biodiversity impacts and to promote positive Biodiversity impacts.

2.0 Scope

This procedure applies to all operational activities conducted at AES Levant

3.0 Definitions

AES Annual Sustainability Questionnaire – An annual questionnaire issued by the AES Global EHS & Security team which solicits sustainability information, including information on Biodiversity management activities, from each AES Business.

AES Business – Any AES location in which AES has overall management control, regardless of what percentage of equity control AES has in that location. AES Businesses for the purposes of this Standard include power generation plants, T&D businesses, and construction projects, but do not include stand-alone administrative offices because these sites are not covered under the AES Environmental Management System.

AES Global EHS & Security (EHS&S) – The corporate AES function that is responsible for setting AES-wide environmental, health, safety and security policies, standards, and procedures, and that is tasked with monitoring and reporting on AES-wide EHS&S performance.

Aspects & Impacts Assessment (AIA) – An AES Environmental Management System (EMS) process that periodically assesses environmental aspects and impacts of an AES Business. AES Levant is required to review and update their AIAs at least annually.

Biodiversity – The term given to the variety of life on Earth. It represents the variety within and between all species of plants, animals and micro-organisms and the ecosystems within which they live and interact. An area is considered to have “high” Biodiversity value if it is so defined by relevant scientific literature and/or regulatory agencies.

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4.0 Requirements

- AES Levant will review annually its existing and ongoing Biodiversity impacts during the annual Environmental Aspects & Impacts Assessment (AIA) and update the appropriate sections of the AIA form.
- AES Levant must comply with all existing Biodiversity applicable local regulatory requirements and other standards.
- AES Levant shall prepare and submit each year to the AES Global EHS & Security team an AES Annual Sustainability Questionnaire and this questionnaire, includes but not limited to Biodiversity related information. The questionnaire will be issued by the AES Global EHS & Security team along with necessary instructions to submit the report.
- AES Levant shall avoid new actions resulting in negative Biodiversity impacts unless it is permitted or approved in writing by appropriate local regulatory agencies. All new actions that will result in any positive or negative Biodiversity impact must be communicated to AES Global EHS & Security at least 90 days before they occur with a quantitative description of the anticipated impact, a description of what mitigation actions are planned and/or were considered, and a description of the permit approval type and approving authority via corporate email with delivered and read confirmation.
- AES **Levant** shall avoid new actions involving exploring/mining/drilling in or otherwise directly impacting World Heritage areas(see Appendix A) (<http://whc.unesco.org/en/list/>) and IUCN Category I-IV protected areas (http://www.iucn.org/about/work/programmes/gpap_home/gpap_quality/gpap_p_acategories/). All such anticipated impact must be communicated to AES Global EHS & Security at least 90 days before they occur with a quantitative description of the anticipated impact and a description of what mitigation actions are planned and/or were considered via corporate email with delivered and read confirmation.
- AES Levant shall avoid new actions that contribute or lead to the extinction of IUCN listed endangered species (<http://www.iucnredlist.org/>). All such anticipated impact must be communicated to AES Global EHS & Security at least 90 days before they occur with a quantitative description of the anticipated impact and a description of what mitigation actions are planned and/or were considered via corporate email with delivered and read confirmation.

5.0 Local Regulatory Requirements and Other Standards

In preparing Biodiversity Assessment & Protection Procedure, consideration has been given as appropriate to the World Bank / IFC's Performance Standards on Social and

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Environmental Sustainability. Consideration has also been given to the relevant Jordanian Laws. The relevant legislation is summarized below.

Applicable Jordanian Laws and Standards

- Environmental Protection Law (No.52, 2006).
- Antiquities Law (No.23, 2004).
- Crafts and Industries Law (No. 16, 1953) and related regulations.
- Organization of Natural Resources Affairs Law (No. 12, 1968).
- Quarries By- Law (No. 8, 1971).
- Regulations for protection of birds and wildlife and rules governing their hunting (Reg. No 113, 1973)
- Traffic Law (No. 47, 2001).
- Agriculture Law (No. 44, 2002).
- Bylaw on Protected Area and National Park (No. 29, 2005).
- Bylaw on Environmental Impact Assessment (No. 37, 2005).

On the international level, Jordan has participated in and signed international conventions that protect the environment and biodiversity as well. International agreements that protect Jordan's' biodiversity are as follows:

- Convention on Biological Diversity (Rio de Janeiro, 1992), Ratified 1996.
- Convention on the conservation of the migratory species of Wild Animals (Bonn, 1979).
- Convention on International Trade in Endangered Species, CITES of wild fauna and flora (Washington, DC, 1973), Ratified
- Convention on Wetlands of International Importance Especially as Waterfowl Habitats (Ramsar, 1971), Ratified

Safeguard Policies

- IFC Operational Policy OP 4.04 Natural Habitats April 2013.

Guidance Notes

- Guidance Note 6: Biodiversity Conservation and Sustainable Natural Resource Management.
- Guidance Note 8: Cultural Heritage.

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6.0 Ecology and biodiversity

The ecological studies undertaken have assessed the direct and indirect impacts of the plant operation on various aspects of terrestrial biological environment in the plant area. These studies have included consideration of:

- Bio-geographical zones in which the plant is located with regard to flora in the plant area: This has included consideration of typical vegetation coverage, vegetation communities, and rare and endangered vascular plant species.
- Fauna of the plant area: Among this large taxonomic group, there are certain smaller groups to study. These groups are considered easy to assess bio indicators for the status of the fauna because of their higher tropic levels. These groups are large mammals, conservation important small mammals, birds especially the conservation important resident species and conservation important reptiles.
- Sensitive Habitats: These are the areas of biological importance, which includes; protected areas, national parks, range land reserves, important bird areas, wetlands under Ramsar sites, unique habitats and ecosystems and isolated natural sites (Biodiversity Islands).

6.1 Assessment Methodology

A variety of methods were employed to assess the existing biological environment aspects at the plant area and to evaluate the expected impacts on these aspects dependent on the subject being studied.

Methods included the following:

- Literature Survey: The survey team collected and reviewed the available data relating to the biological environment in the plant area. Data collection was achieved through:
 - ❖ Library search for the available reference information on the biodiversity or any biologically sensitive areas identified.
 - ❖ References from institutions that are working in this field of specialty such as, Ministry of Environment (MoE), Royal Society for Conservation of Nature (RSCN) and University scientists and specialists
- Field work survey: These surveys were undertaken to confirm the literature survey findings. A number of different techniques were used in the field to assess the biological environment as the following:
 - ❖ Line transects: This technique was used to study most of the biological aspects of environment as the following:
 - Flora: Line transects was employed used to study changes in vegetation along a physical environmental gradient. This also allowed the surveyor to estimate overall density of cover values of species of a single type of

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vegetation, which also can be correlated to various physical environmental factors such as salinity, humidity, soil composition, topography etc.

- Fauna: This involved the researchers walking the plant area in a systematic way that enabled them to cover the whole area. This technique was applied for different target groups of fauna as follows:
 - ✓ Birds: line transects are effective methods to study birds of open habitats in both terrestrial and wetland habitats. This method was used to identify counting density along various environmental gradients.
 - ✓ Mammals: line transect were walked for both large and small mammals, and for large reptiles. This represents the most practical and direct method for counting mammals and or recording them through a gradient of various environmental factors. It depends mainly on recording their sings like foot pints, spoors and body remnants.
- ❖ Spotlight Technique: this method was applied for large terrestrial mammals and reptiles also for nocturnal birds, which was implemented easily by car at plant area to record the habitat use for these nocturnal species.
- Interviewing Technique: This technique was used to study the historical record for the flora and fauna of the area. It was used to correlate the environmental changes with the change on the biological environment, then to build up the prediction for the future trend in biological environment with the presence of the expected impacts of the operation of the plant.
- Photographing Technique: This technique was used to document the recorded data, especially the important biological features of the study sites. It was necessary for this study to identify what is called photo stations in selected sampling units in the project area, in order to help also in the future monitoring and to document early stage of changes that can happen to the biological diversity in this area.

6.2 Exiting Environment

6.2.1 Sensitive Habitats

Sensitive natural habitats are identified as:

- i. Existing protected areas and areas officially proposed by governments as protected areas (eg, reserves that meet the criteria of the World Conservation Union [IUCN] classifications (Appendix B)), areas initially recognized as protected by traditional local communities (eg, sacred groves), and sites that maintain conditions vital for the viability of these protected areas (as determined by the environmental assessment process); or
 - ii. Sites identified on supplementary lists prepared by the World Bank or an authoritative source determined by IFC's Environment Division. Such sites may include areas recognized by traditional local communities (eg, sacred groves); areas with known high suitability for biodiversity conservation; and sites that are critical for rare, vulnerable, migratory, or endangered species
- 4 Listings are based on systematic evaluations of such

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factors as species richness; the degree of endemism, rarity, and vulnerability of component species; representativeness; and integrity of ecosystem processes.

The guidance also notes that as part of a private sector project IFC supports natural habitat conservation, improved land use and the maintenance of ecological functions. Furthermore, IFC promotes the rehabilitation of degraded natural habitats.

The plant is not located in an area that would require it to be classified as a critical natural habitat and therefore it is considered that the plant operation does not contravene the policies of the World Bank and IFC with regard to such habitats.

No protected sites are close for that not mentioned, the closest protected area is between 80–100 km, and closest national park is not less than 25 km.

The plant site lies in the Al Al-Manakher area, 8 km to the east of Amman ring road on unused land owned by the Ministry of Finance/Department of Lands and Surveys.

6.2.2 Flora

The proposed site for the power plant has shown clear evidence of past and current use of the site for agriculture practices. This agriculture is restricted to the annual crops like wheat and hey that used for livestock feed. The continuous ploughing of the project site has removed the natural vegetation cover that almost disappeared from proposed site and only remnants of that vegetation cover is found at the small depression wadies that cross the site which are not used for agriculture, in addition to the side of the old road found at the site.

Only two species of natural plant found in the site of the power plant that are representative of the two vegetation types found in the surrounding area. Both of the recorded plant species are not conservation importance since it is common at its vegetation type. These were:

Rhamnus palaestinus: This plant is considered decreasing in the country since it used for making fire in some nomad communities, but at the site it was removed in the past to prepare land for agriculture.

Anabasis syriaca: common and do not have any conservation value.

6.2.3 Fauna

Due to the deterioration and the absence of the natural vegetation at the site for the power plant, the faunal diversity recorded at the site is minimal. Just one species of reptiles, three species of mammals and five species of birds where recorded at the site and the surrounding area within 500 m from the site borders.

The recorded fauna species and their conservation are the following:

Reptiles

Acanthodactylus boskianus: common in various habitats in Jordan. This species was observed despite its preference for natural vegetation. The species is also found in high numbers at agriculture lands.

Mammals

Lepus capensis; Cape Hare: This species has been recorded through interviewing locals, who have identified the presence of the cape hare in the area in spite of the sharp

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decrease the species populations due to in the main the human activities and habitats loss by agriculture.

The conservation status of this species in Jordan is not well defined due to a lack of sufficient data regarding populations, however it is more common in the eastern parts of Jordan where the open desert is considered a very suitable habitat.

Rattus rattus; Common Rat: This species has been recorded during the baseline survey through the borrows records and the scats and foot prints, in addition to the information obtained from locals who identified the presence of this species in large numbers especially during the harvesting seasons in the area for wheat or hey.

This species has no conservation status wherein considered common in and near human settlements with its distribution connected to the human activities, especially agriculture wherein might be considered as vermin.

Vulpes vulpes; Red Fox: one of the most common large mammals in Jordan, which found in most of the Jordanian habitats and ecosystems. This species recorded at the site is through footprints and scats and the interviewing of locals who confirmed the presence of this species in the area.

Birds

Streptopelia senegalensis; Laughing Dove: This species has been recorded at the site through direct observation. It is one of the most common birds found in numerous habitats. It has no important conservation value.

Galerida cristata; Crested Lark: One of the most common birds in the northern half of Jordan. It is resident in almost all of the habitats in the country. Populations are especially high in cultivated areas. It has been recorded at the site of the power plant by direct observation. The conservation status of this bird of Jordan is common ie it is not threatened.

Pycnonotus xanthopygos; Yellow-vented Bulbul: A very common and resident bird that found in mainly at the semi urban habitats, and those containing cultivated lands. It has been recorded through direct observation. It has no important conservation value.

Oenanthe deserti; Desert Wheatear: Is a widespread desert bird that even found at the transitional zones between the desert habitats and others. The presence of this species at the site of observation at the project site. It has no important conservation value.

Passer domesticus; House Sparrow: A very common resident bird, which clearly attached to human activity and settlements. It was recorded through a direct observation at the proposed site of the power plant. It has no important conservation value.

7.0 Cultural Heritage

An archaeological survey was conducted in the plant area. The aims of the survey were to:

1. Locate archaeological sites within the limits of the site.
2. Identity those sites that may be threatened by the project.
3. Define the works necessary to minimize the threat to the regional cultural resources base by the project.

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4. Provide preliminary estimate (Sufficient for project budgeting purpose) of the scale and scope of the cultural resources program likely to be required.
5. Provide a suitable implementation structure for the cultural resources management project.

A team composed of two archaeologists surveyed the project area and the surrounding zone, and registered, in addition to mapping, all the sites located within 250 m of the project area. The available maps used in the survey were 1-25,000 or 1-50,5000 scale series k737.

The survey was conducted on foot, with survey members walking at distance between 20-30 meters from each other. Sample collections were taken at all sites and site features were recorded.

In brief, the team survey registered and mapped all features that may be affected by the project. The summary of tasks undertaken is as follows:

1. JADIS Searching/Department of Antiquities of Jordan (DOA).
2. Library Searching/DAJ/ACOR/BCRL.
3. Field visit.
4. Field Survey.
5. Field Documentation.
6. Data Analysis/compute.
7. Report preparation.
8. Final Report issue with recommendations.

7.1 Legal Framework

Work has taken in to consideration the relevant Jordanian legislation regarding the protection of archaeological remains (Antiquities Law (No.23, 2004)). In making the impact assessment consideration has also been made to the Guidance Note 8 of the World Bank.

The Antiquities Law provides the basic legal framework for archaeological and historical concerns in Jordan. It is an all-embracing law that regulates policies and imposes penalties.

The Act, under article (3) which ban excavation within a distance less than 1 km from archaeological location premises and in all cases is stipulated to get pre-permission from the concerned department before bidding for engineering services, design and drawing, or preparing bidding documents for the private or public projects in accordance with this article.

The Act also required under article (14) that proponents ensure that the project location is free from any archaeological materials, before any excavations, in order to avoid any penalty defined by article (27) from the law.

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It is considered that the act is somewhat deficient in a number of areas that necessitate a further degree of assessment outside the requirements of the Act including:

1. There is no legal requirement that specify an accredited agency to determine if there are impacts from the project at the cultural recourses. Legal sanctions are only available when a site is found, and even then some interpretation of the requirements is possible.
2. It is, as of yet, not necessary for all agencies that carry out works to notify, the DOA even if the works may affect archaeological or historical sites.
3. There is, as of yet, no requirement for official agencies or private sector developers to make provisions for archaeological works in development contracts.

These deficiencies have and will be mitigated as the project ESIA is required to meet World Bank

Standards and has therefore considered the World Bank “Guidance Note 8: Cultural Heritage” that requires due consideration of impacts to cultural property in Bank financed projects. As required by the policy a desk based assessment and site walk over has been undertaken by a competent archaeologist.

The investigation revealed the presence of no archaeological sites in the area of the power plant project, which may be affected by field activities. There are some archaeological sites in the area but these are located outside a 5 km radius of the proposed power station site; these sites have recently been afforded protection measurements by DOA. The project therefore complies with the Archaeology Act with regard to protected Archaeological Sites.

The survey revealed no seen archaeological sites. Only a few scattered flints, that are potentially man made, were noticed on the surface and are likely present as a result of being washed away from the nearby hills during the winter season. The project therefore complies with the Archaeology Act with regard to the disturbance of identifiable Archaeological on site.

Therefore, the only concern regarding this issue would be the unseen sites or archaeological remains that might be discovered by chance during the construction activities such as excavations and site preparation.

Therefore, there is no direct impact to these Archeological areas.

8.0 Impacts during Operation

Operation of the site may lead to the disturbance of created habitats through noise, movement and lighting. This may limit the value of these habitats to some species e.g. small mammals and birds. However these effects will be minimized by directional lighting and buffer planting.

Workers will be prevented from hunting or killing local wildlife. Any accidents resulting in the death of wild life will be reported to the Ministry of Environment and RSCN.

Disposal of domestic or industrial wastes will be to appropriate disposal sites. The disposal of wastes on site, and in the in the surrounding area especially at the near shallow wadies will not be allowed.

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9.0 Operational Impact Mitigation, Monitoring, and Management Measures

Concern	Significance	Mitigation Measure	Monitoring	Implementation Procedure
Removal of existing natural vegetation	Low Significance	The proponent will avoid any unnecessary removal of existing natural vegetation.		Environmental manager will ensure that staff are aware of the requirement as necessary
Unauthorized/inappropriate parking	Low Significance	Use of machinery will be restricted to the proposed site as will parking of vehicles.		Environmental manager will ensure that staff are aware of the requirement as necessary
Contamination by vehicle maintenance	Moderate Significance	Any maintenance of vehicles or machinery will be performed off site unless strictly necessary.		Environmental manager will ensure that staff are aware of the requirement as necessary
Destruction of bird nests	Low Significance	The destruction of bird nests will be prohibited.		Environmental manager will ensure that staff are aware of the requirement as necessary
Hunting or killing of animals	Low Significance	The proponent will not allow workers to hunt or kill animals.	Any accidents resulting in the death of wild life will be reported	Environmental manager will ensure that staff are aware of

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			to the Ministry of Environment and RSCN	the requirement as necessary
During night disturbance of wildlife	Low Significance	Construction activity will be kept to a minimum during night time to decrease disturbance on wildlife in the area		
Planting of exotic or invasive plants	Low Significance	The planting of exotic or invasive plants for landscaping inside and around the plant will be prohibited with a preference given to the planting of native species where landscaping is deemed necessary		Environmental manager will ensure that staff are aware of the requirement as necessary
Disposal of domestic or industrial wastes	Moderate Significance	Disposal of domestic or industrial wastes will be to appropriate disposal sites. No materials will be disposed of onsite and in the surrounding		Disposal of domestic or industrial wastes to appropriate disposal sites as necessary

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		area especially at the near shallow wadies.		
Unauthorized/inappropriate parking	Low Significance	Parking on areas outside the project area will not be allowed unless strictly necessary.		Environmental manager will ensure that staff are aware of the requirement as necessary
Light pollution	Moderate Significance	Directional lighting and buffer planting to screen the plant.		Part of plant design and requirement of EPC Contract

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Appendix A

According to UNESCO **World Heritage List**, The list from the Convention Concerning the Protection of the World Cultural and Natural Heritage now consists of 936 properties. It thus forms part of the cultural and natural heritage that the World Heritage Committee considers as having outstanding universal value. It also provides additional information about World Heritage Sites.

The legally-protected archaeological areas in Jordan are:

- Petra.
- Quseir Amra.
- Um er-Rasas (Kastrom Mefa'a).
- Wadi Rum Protected Area.
- Baptism Site “Bethany Beyond the Jordan” (Al-Maghtas).

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Appendix B

IUCN Category I-IV protected areas

According to Fifth National Report on Biodiversity in Jordan, the protected areas in Jordan are:

1. Shoumari Wildlife Reserve
2. Azraq Wetland Reserve
3. Mujeb Biosphere Reserve
4. Ajloun Forest Reserve
5. Dana Biosphere Reserve
6. Wadi Rum World Heritage Site
7. Aqaba Marine Park
8. Dibbin Forest Reserve
9. Yarmouk Forest Reserve
10. Qatar Nature Reserve
11. Fifa Nature Reserve