

EBRD COVID-19 Resilience Framework - Environmental and Social Assessment Training Programme

Module 6 – Typical environmental and social risks for the power generation sector

Introduction

The purpose of Module 6 is to provide a summary of typical environmental and social risks that may need to be assessed for a Project within the power generation sector. It should be noted that these are just examples of potential risks and the consultants will need to use their professional judgement and knowledge of the sector to identify specific risks on each given Project.

NOTE: the following impacts are likely to be relevant to all types of power generation equipment:

- Impacts to biodiversity from land clearance activities leading to habitat loss, degradation, fragmentation, and species displacement.
- Increased health and safety risk to the workforce from exposure to high-voltage equipment.
- Increased health and safety risk to the workforce from the need to enter confined spaces, to work at height, the storage and handling of chemicals, the risk of fire and explosion, and from the generation of dust.
- Increased community health and safety risk arising from the transportation of large and heavy loads using vehicles on the public road network.

Geothermal power generation

- The potential for large quantities of liquid effluent waste (including drilling fluids) and solid waste (including drilling cuttings) to be generated, leading to surface or groundwater contamination.
- The potential for large quantities of spent geothermal fluids (reject water and condensate following power generation) that may contain a high content of heavy metals, low pH and feature a high temperature, to be generated, leading to surface or groundwater contamination.
- The potential for an accident or emergency event to occur such as a well blowout or pipeline failure, leading to injuries and fatalities.

Thermal power

- The generation of air emissions (such as mercury and hydrogen sulphide), leading to a deterioration in local and regional air quality, as well as contributing towards acid rain.
- The generation of noise during operation of the power station.
- The installation of cooling water intake and discharge pipelines within a coastal and shoreline environment, generating large quantities of suspended sediment leading to impacts on marine flora and fauna, and marine-based livelihoods.
- The abstraction of water (including cooling water) from surface or groundwater bodies, leading to the reduced availability and water quality to other users, as well as potential impacts on aquatic receptors and livelihoods.
- The discharge of cooling water to receiving waters at a higher temperature containing biocides and other additives, leading to impacts on aquatic receptors, livelihoods, and potentially human health from the intake of pollutants within the food chain.
- The potential for large quantities of liquid effluent waste (including oils) and solid waste to be generated, leading to soil and groundwater contamination.
- The potential for an accidental or emergency event to occur, such as a thermal explosion and high-pressure blast, leading to injuries and fatalities.

Solar power

- Impacts to landscape and views, especially if visible from, or located near, to residential areas or tourism sites, leading to a loss of livelihood (for businesses), amenity, and general wellbeing. This includes a potential loss of amenity of cultural heritage resources.
- Changes to local drainage flows and increased soil erosion arising from the installation of internal cables, access roads and solar arrays.
- Health and safety risks to the workforce arising from the need to work at height, work in remote locations, and from lifting operations.
- Impacts to biodiversity from land clearance activities leading to habitat loss, degradation, fragmentation, and species displacement.
- Collision risks to birds through mistaking solar arrays for water bodies.

Hydropower Projects

- Generation of a barrier for the continuity of a river ecosystem and its functions, including sediment transport, fish migrations and general use of river systems for transport and other purposes (for dams).
- Fragmentation of aquatic ecosystems and terrestrial ecosystems through the diversion of water (for run off river schemes).
- Changes to water flow, water level or riverbed morphology and changes in downstream water quality.
- Net water losses being generated from the impoundment of water, evaporation, and infiltration.
- A loss of public and private access to surface water systems that provide livelihoods, recreational value, or cultural value.
- A loss or reduction in livelihoods due to river regime changes and its impacts on water use and other river-related activities (fisheries, irrigation, tourism, gravel extraction, etc.), including fragile livelihoods and informal market activities.
- The installation of underground tunnels generating significant quantities of noise and vibration to biodiversity receptors and nearby communities.
- The potential for cumulative impacts to occur from other hydropower Projects being constructed within the same catchment area.
- The potential for catastrophic failure of a dam or other major structural component to occur leading to downstream impacts on biodiversity and local communities.

NOTE: for additional guidance on assessing impacts of hydropower Projects, refer to EBRD's Environmental and Social Guidance Notes on Hydropower Projects and Small Hydropower Projects:

<https://www.ebrd.com/cs/Satellite?c=Content&cid=1395251554410&d=&pagename=EBRD%2FContent%2FDownloadDocument>;

<https://www.ebrd.com/cs/Satellite?c=Content&cid=1395282223417&d=&pagename=EBRD%2FContent%2FDownloadDocument>

Wind energy

- Impacts to landscape, seascape and views, especially if visible from, or located near, to residential areas or tourism sites, leading to a loss of livelihood (for businesses), amenity, and general wellbeing. This includes a potential loss of amenity of cultural heritage resources.
- The generation of noise during operation of the turbines which includes mechanical sources (from the gearbox and generator) and aerodynamic sources (from the movement of air passing over the blades), leading to areas of land that may be unsuitable for living and other purposes.
- The generation of shadow flicker on land receptors from the movement of the sun passing behind the wind turbine, leading to areas of land that may be unsuitable for living and other purposes.
- Changes to local drainage flows and increased soil erosion arising from installation of internal cables, access roads and turbine foundations.
- Health and safety risks to the workforce arising from the need to work at height, work over water, work in remote locations, and from lifting operations.
- Increased risk to community health and safety arising from blade and ice throw, leading to injuries and fatalities.
- The potential for an accidental or emergency event to occur such as the failure of the physical integrity of the turbine blades, leading to injuries and fatalities.
- Increased risk to aviation (particularly low-flying aircraft), leading to injuries and fatalities.
- Increased risk to marine navigation and safety (for offshore installations), leading to injuries and fatalities.
- The generation of electromagnetic interference and radiation, leading to interference with telecommunication systems and television receptions.
- The increased risk of injury or mortality to birds and bats from collisions with wind turbine blades.
- Impacts to biodiversity from operation of the wind turbines leading to species displacement and behavioural change.

NOTE: for additional guidance on assessing impacts of wind power Projects refer to the following guidance documents:

European Commission - Wind Energy Developments and Natura 2000:

https://ec.europa.eu/environment/nature/natura2000/management/docs/Wind_farms.pdf

Good Practice Guide – A resource of reconciling wind energy development with environmental and community interests:

https://ec.europa.eu/energy/intelligent/Projects/sites/iee-Projects/files/Projects/documents/gpwind_good_practice_guide_gp_wind_en.pdf