OrPower Geo (49972)

Project Basic Information

Country: Kenya	Region: East Africa 2	Project No.: 49972
Project Legal Name: OrPower Geothermal	Company Legal Name: Orpower Twenty Two Limited	
Project Business Sector: V-BE - Geothermal - Renewable Energy Generation	Owning Department /Division: Regional Industry - INF Africa	
Environment Category: B		

IFC's Disclosure Requirements

Date of initial ESRS disclosure
10/31/2025

Date of revised ESRS disclosure

Date of clearance by client for factual accuracy
10/31/2025

Board Approval Date

Project Description

The proposed investment comprises an IFC senior loan of up to USD 30 million, and parallel/B-lender mobilization of up to USD 37.5 million to support the construction and operation of a 35 MW geothermal power facility ('Orpower' or 'the project") within the Menengai Caldera geothermal field in Kenya. The project site is situated within a public forest reserve under the jurisdiction of the Kenya Forest Service (KFS), which has formally granted a sub-lease authorizing geothermal development activities, including OrPower's operations, within the protected area. The proposed plant will be the third and final 35 MW plant to be established in the Menengai field and will share geothermal resources and power evacuation infrastructure with two other independent power producers (IPPs): Globeleq Menengai Limited (GML) and Sosian Energy, operated by Kaishan Group, the sponsor of this project.
The project is being developed by OrPower22 Ltd ('OTTL' or 'Orpower'), a special-purpose vehicle owned by Kaishan Renewable Energy Development Limited (KRED), a Singapore-registered subsidiary of the Kaishan Group ("Kaishan"), the project sponsor. Kaishan and KRED will act as the Engineering, Procurement, and Construction (EPC) contractor and later as the Operations and Maintenance (O&M) provider. The project construction began earlier in 2025 and is expected to commence operations in March 2026. Civil works, specifically the construction of foundations and structural components are substantially complete. The installation of key equipment namely turbines, generators, turbines etc is about 80% complete. The installation of the roughly 120m power evacuation line connecting the plant to the adjacent Menengai substation is also complete.
Geothermal Development Company (GDC) completed critical infrastructure which also serve the two other IPPs in the Menengai field. These include the steam gathering system that connects the supply wellheads to the plants, the brine management infrastructure including brine re-injection wells, lined emergency ponds and related facilities by 2023. Additionally, during the geothermal exploration phase, enhancements and completion of access roads to the wellfield, internal roads network, potable water boreholes, and bulk water storage tanks were carried out. These facilities are shared among the three IPPs and already operational. Records show that in 2012/2013, land was acquired from 22 persons for expansion of the access road to the wellfield. Similarly, the Kenya Electricity Transmission Company (KETRACO) developed and manages the Menengai substation and a 13 km, 132 kV transmission line evacuating electricity from the field to the pre-existing Soilo substation in Nakuru town. The Menengai substation includes designated bays for the IPPs and is already operational. 25 landowners were economically displaced for the power line right of way and paid compensation in 2016, in accordance with local land acquisition laws and procedures. Although these infrastructures provided by GDC and KETRACO are essential for Orpower's plant operation, they do not strictly meet the IFC Performance Standards (PSs) mutual dependency criteria for Associated Facilities (AFs) since they were designed to serve the three IPPs and would have been constructed and operated regardless of Orpower project's implementation.
Orpower has signed two 25-year agreements underpinning project operations: a Project Implementation and Steam Supply Agreement (PISSA) with GDC for geothermal steam supply, and a Power Purchase Agreement (PPA) with Kenya Power and Lighting Company (KPLC) for electricity sales. All three IPPs in the Menengai field operate under Build-Own-Operate (BOO) contracts awarded by the Government of Kenya.

Overview of IFC's Scope of Review

IFC's review of the proposed investment consisted of appraising environmental, health and safety (EHS), and social related information submitted by the project sponsor. This encompassed technical details about the project; Environmental and Social Impact Assessment (ESIA) reports prepared in 2019, updated in 2024, and supplemented in 2025 (disclosed herewith); Orpower and Kaishan's Environmental and Social (E&S) policies and procedures, and Management System manual; Sosian's E&S management plans adapted for use at Orpower; Human Resources (HR) management procedures, training records, Orpower and GDC's emergency response plans, Kaishan's EPC contract and Construction EHS management plans; copies of the PISSA and PPA, Orpower's stakeholder engagement plan, among others. IFC also reviewed GDC's ESIA and E&S monitoring reports, KETRACO's transmission line's ESIA and Resettlement Action Plans (RAPs), and the Kenya Forest Service's (KFS) ESIA for the proposed forest electric fence and participatory forest management plan .
Three site visits and walkthroughs of the project site were conducted as part of the appraisal process, respectively on 17 October 2024, 26 November 2024, and 25 August 2025. During these visits, IFC engaged with key stakeholders, including senior management from Orpower and Kaishan, representatives from GDC, KETRACO, and KFS, as well as community leaders and local authorities.

Identified Applicable Performance Standards

While all Performance Standards are applicable to this investment, IFC's environmental and social due diligence indicates that the investment will have impacts which must be managed in a manner consistent with the following Performance Standards.

PS1-Assessment and Management of Environmental and Social Risks and Impacts
PS2- Labor and working conditions
PS3-Resource Efficiency and Pollution Prevention
PS4-Community Health, Safety and Security
PS6-Biodiversity Conservation and Sustainable Management of Living Natural Resources

Environmental & Social Categorization and Rationale

This is a Category B project according to IFC's Policy on Environment and Social Sustainability (2012). Based on information reviewed by IFC, the proposed project will have limited adverse E&S impacts that are few, site specific, largely reversible and readily addressed through existing mitigation measures and good international industry practices (GIIP).
Key E&S issue and risks include: (i) the adequacy of the project's E&S management system to assess and manage E&S risks and impacts from the project construction and operations, compounded by cumulative risks resulting from operations of the two adjacent plants, as well as GDC and KETRACO's facilities; (ii) E&S competency of the project's as well as the EPC and O&M contractor's E&S teams; (iii) consistent management of labor and working conditions, and occupational health and safety (OHS) policies and practices for employees and contractors; (iv) monitoring and management of air emissions, noise, waste, wastewater and hazardous materials; (v) emergency planning and response, (vi) community health and safety and management of security forces; (vii) biodiversity risk assessment and management in line with PS6; (viii) stakeholder engagement and community grievance mechanism.

Environmental & Social Mitigation Measures

(Observations that are not to be disclosed must be recorded in ESG360)
IFC's appraisal considered the environmental and social management planning process and documentation for the Project and gaps, if any, between these and IFC's requirements. Where necessary, corrective measures, intended to close these gaps within a reasonable period of time, are summarized in the paragraphs that follow and (if applicable) in an agreed Environmental and Social Action Plan (ESAP). Through implementation of these measures, the Project is expected to be designed and operated in accordance with Performance Standards objectives.
Applicable Performance Standards
PS1: Assessment and Management of Environmental and Social Risks and Impacts
Environmental and Social Assessment and Management System (ESMS). Orpower has adopted the Kaishan Group's ESMS framework, as documented in its ESMS Manual and already implemented at the adjacent Sosian geothermal plant. The ESMS is designed to address hazard identification, ensure legal compliance, and drive continuous improvement throughout all project phases—construction, operation, and decommissioning. The ESMS reflects the leadership's commitment to meeting both Kenyan regulatory requirements and international standards, including the IFC Performance Standards (PSs) and World Health Organization (WHO) guidelines. During the project construction phase, Orpower coordinated the development of the 'Construction ESMP (C-ESMP)' by the EPC, to ensure compliance with project-specific KPIs and regulatory requirements. The C-ESMP provides a structured approach to E&S risk assessment and management, stakeholder engagement, grievance redress, emergency preparedness, and continuous improvement. It ensures compliance with international standards and Kenyan regulations through clear organizational structures, actionable plans, and transparent reporting. The C-ESMP is consistent with the principles of IFC's PSs.
While the ESMS is generally appropriate for the nature and scale of the project and adequate for the construction phase, it lacks detailed procedures, monitoring indicators, and reporting protocols for the operational phase. To address this, Orpower will enhance its ESMS by incorporating additional management programs and operational procedures, as outlined in the following sections. This will include a 'risk and

impacts identification procedure' that aligns with PS1 principles. The company will also ensure that the O&M contractor updates and implements its ESMS in alignment with these improvements (ESAP #1).
As required under the EPC and O&M agreements, Kaishan has established comprehensive management guidelines to ensure full adherence to its E&S commitments. These requirements are contractually extended to all subcontractors. Contractors are required to submit and implement their E&S Plans, comply with all relevant Kenyan laws and applicable international standards, and maintain a zero-accident target.
Policy. The ESMS is underpinned by a comprehensive EHS policy that emphasizes proactive risk management through employee involvement. The policy aims to safeguard people, property and the environment, while also supporting operational efficiency. Key commitments include regulatory compliance, ongoing improvement, stakeholder engagement, and effective contractor oversight. The policy adheres to both local regulations and international standards and is in line with the principles of IFC PSs.
Identification of Risks and Impacts. Orpower's operations are governed by the Kenya Environmental Management and Coordination Act (EMCA) and the Energy Act of 2019, which require Environmental and Social Impact Assessments (ESIAs), periodic audits, and licensing from National Environment Management Authority 'NEMA' and Energy and Petroleum Regulatory Authority 'EPRA'. The company has prepared multiple ESIA versions (2019, 2024, and a supplemental study in 2025), which are consistent with IFC PS1. These assessments comprehensively cover physical, biological, and social aspects and include mapping of sensitive receptors. Specialist studies—such as air dispersion modeling, noise assessments, and biodiversity surveys—have informed the significance of impacts and mitigation planning. Key risks identified include hydrogen sulfide emissions, noise pollution, biodiversity disturbance, and community impacts. The studies note that operational risks are accentuated by cumulative impacts from adjacent geothermal plants (Sosian and GML), GDC's steam supply infrastructure, brine ponds, and KETRACO'S transmission line. Moreover, cumulative noise modeling has shown that baseline daytime noise levels already exceed local regulatory limits. This is further discussed in the PS3 section.
There is a joint mechanism for addressing cumulative impacts at the caldera level, coordinated primarily by GDC through the 'Caldera E&S Management Committee'. This mechanism involves monthly meetings, regular joint monitoring, and escalation protocols, with participation from GDC, IPPs, contractors, and relevant agencies such as KFS, KWS, NEMA, and Nakuru County Government. The committee's scope covers all major cumulative impact domains—including air, water, noise, biodiversity, visual, and socio-economic impacts—and is designed to function both proactively (through routine monitoring and adaptive management) and reactively (responding to stakeholder concerns and emergencies), supporting ongoing, field-wide compliance and continuous improvement.
A caldera-level field survey conducted in February 2015 by the National Museums of Kenya confirmed the absence of archaeological or culturally significant features within the project area. Although no signs of human modification were identified, the report indicated that there remained a low likelihood of encountering human remains, based on findings from comparable geological contexts. To address this potential risk, the project has implemented a 'Chance Find' procedure, as further detailed below. To date, following the completion of excavation activities, there have been no reported chance finds.
At the project level, Orpower has established a risk management framework which includes task-specific risk assessments, engineering controls, and protocols primarily implemented by the EPC contractor. These measures, however, may not adequately address risks associated with hazardous material, specifically hot steam, hydrogen sulfide or brine handled during operations as they are not informed by a formal process safety assessment, as required under IFC PSs and EHS Guidelines (both General and for Geothermal power generation operations). To address this gap, Orpower will engage a qualified and experienced consultancy to conduct a comprehensive process safety assessment. This assessment will include a Hazard Identification (HAZID), a Hazard and Operability Study (HAZOP), and a Quantitative Risk Assessment (QRA) as necessary. The outcomes will inform the design and implementation of additional engineering safeguards and mitigation measures if needed. Additionally, Orpower will appoint a dedicated Process Safety Lead or engage a suitable consultant responsible for overseeing the development, execution, and continuous improvement of the process safety framework. (ESAP #2)
Management programs. The project's E&S management programs are primarily documented in the Construction Environmental and Social Management Plan (C-ESMP) and a suite of thematic E&S management plans, designed to address risks and mitigation measures across construction, operation, and decommissioning phases. Thematic plans cover air quality, water management, noise control, erosion prevention, waste management, biodiversity protection, traffic safety, occupational and community health and safety, and emergency preparedness. The C-ESMP includes a 'Chance Find Procedure' to protect cultural heritage during construction. This procedure outlines protocols for halting work, securing the area, and notifying relevant authorities if cultural heritage items are discovered. Construction personnel received training on artifact recognition and reporting and were instructed to document any occurrence in a dedicated register. Contractors are required to promptly report all accidents, incidents, and near-misses, conduct investigations, and submit periodic summary reports to the Employer. The plans also outline shared

responsibilities with GDC, KETRACO, KFS and adjacent facilities for cumulative impacts monitoring to address issues such as emergency response, emissions and odor control, and community grievance mechanisms.

Some of the plans extend throughout the lifetime of the project, however, several E&S management plans are outdated or refer to future actions. As part of ESAP #1, Orpower will update the E&S management plans to reflect current site arrangements, particularly for stakeholder engagement, biodiversity management, air quality and noise and human resources policies as further detailed below.

Organizational Capacity and Competency. Orpower has defined its E&S organizational capacity for the construction phase, comprising three key roles: an Environmental Safety Health and Social (ESHS) manager, an Environmental Health and Safety officer, and a Community Liaison Officer (CLO). The E&S team is embedded within Kaishan's structure, reporting to the Project Director, and is responsible for ensuring day-to-day adherence to E&S requirements. At the Caldera level, GDC's E&S team, which includes experienced officers, oversees E&S monitoring and the implementation of mitigation measures. Additionally, a joint committee –comprising staff nominated by the various IPPs–is in place to address cumulative impacts such as water use and quality, noise, air emissions, traffic, biodiversity or community complaints. Orpower's CLO serves as the project's representative on the caldera-level stakeholder engagement committee. This structure is adequate to ensure appropriate oversight of E&S risks and stakeholder engagement during construction. As Kaishan will also be responsible for operations and maintenance, under ESAP #1, Orpower will formally confirm the EHS structure that will be maintained during the operational phase. The project will also designate a qualified process safety lead as outlined under ESAP #2.

Emergency Preparedness and Response (EPRP). The project has developed an EPRP which covers hydrogen sulfide (H_2S) leaks, fires, blowouts, brine spills, and natural disasters. In collaboration with the EPC, it uses an Incident Command System (ICS) which defines plant roles and coordination protocols at the Caldera level, involving GDC and adjacent plants. However, the EPRP does not currently incorporate formal process safety assessments, which limits its effectiveness in identifying and mitigating credible worst-case scenarios, particularly for H_2S exposure that may exceed occupational thresholds near emission sources. The plan lacks documented emergency drills, community-level communication protocols, and a designated process safety lead, while some engineering controls such as alarms and detectors have been reported as incomplete. To address these gaps and align with the EHS Guidelines and IFC PSs, Orpower will (i) integrate findings from the formal process safety assessment into the EPRP and where critical, upgrade engineering controls, and (ii) introduce real-time monitoring and feedback mechanisms to strengthen emergency response capacity. (ESAP #3)

Monitoring and Review. Monitoring responsibilities are shared with GDC, which oversees cumulative effects outside Orpower's facility fence line. These include air emissions, odors, rainfall, groundwater, community engagement, and biodiversity. Monthly and quarterly reports are submitted to NEMA and EPRA, and prompt incident notification is required. Simulated air emissions concentrations at nearby receptors are below WHO and Kenyan thresholds for public exposure, but occupational exposure may exceed ACGIH TLV (American Conference of Governmental Industrial Hygienists- Threshold Limit Values) near emission sources. In addition, although periodic management reviews are recommended, no record of such reviews is currently available. Under the enhanced ESMS measures per ESAP#1, Orpower will implement personal detectors and establish restricted access zones and will establish a formal review process to ensure continuous improvement.

PS2 Labour and Working Conditions

The construction and equipment installation phase was undertaken by Kaishan, as the EPC Contractor with about 327 staff at the peak of the construction phase. Majority (80+%) of the construction phase staff were casual and semi-skilled term workers engaged from the local community. At the time of the appraisal, the project was about 70% complete and had retained a workforce of about 90 staff (10% women).

At operation phase, the project will have about 40 staff working on shift basis to enable 24-hour operations at the plant. The on-site staff will be engaged by the O&M Contractor (Kaishan) and will include technical staff as well as janitorial and security contractor staff.

HR Policies, Procedures and Working Terms and Conditions. During construction, Orpower manages labor risks through Labor Management Strategies provided for in the project ESMP. The project retained an on-site HR and Administration Officer Manager to oversee labor risks and support the E&S team in induction of new staff on the company's E&S requirements. The HR and Administration Officer is also responsible for oversight of the EPC contractor workers' Grievance Redress Mechanism (GRM). The project staff are issued with term contracts outlining their engagement terms, pay and termination procedures. The company did not experience any labor action related issues nor any labor related court cases during the construction phase. Orpower will develop an HR policy and procedures manual in compliance with IFC PS2 (ESAP #4). The policies and procedures will integrate measures for direct workers and identify the policy directives and mechanisms for oversight that apply to contracted workers and the supply chain per PS2 requirements, to include commitments on freedom of association and collective bargaining, non-discrimination and equal

opportunity as well as prohibition of child and forced labour. As part of the HR manual, Orpower will outline the company's working terms and conditions, covering recruitment, induction, working hours and shift systems, OHS management, remuneration and benefits, rest days, paid and un-paid leave, performance review, statutory social welfare programs (e.g. pension, statutory health insurance and workers compensation schemes), training and capacity building, workers code of conduct, grievance mechanisms, management of confidential and sensitive HR data, disciplinary measures and termination mechanisms (including dismissal, retirement and retrenchment). The manual will provide clear responsibilities for staff and company management and will be issued to staff at induction after appropriate sensitization, after which relevant records of issuance and sensitization will be kept by company management.

Workers Accommodation. Orpower is constructing workers accommodation at the power plant for 4 staff. As part of ESAP #1, the company will develop policies and procedures to manage workers accommodation and assure workers' rights in accordance with the principles of the IFC good practice note on workers accommodation.

Occupational Health and Safety. Orpower has developed a range of OHS measures implemented via the EPC Contractor, in line with EHS Guidelines. The project's risk analysis covers geothermal sectoral hazards like hydrogen sulfide, noise, heat stress, and fire. Mitigation measures include personal detectors, restricted zones, and engineering controls such as ventilation, dust extractors, and alarms. Administrative controls encompass job safety analyses, toolbox talks, personal protective equipment (PPE) issuance, a structured Incident Command System and emergency preparedness, supported by regular drills and aligned with GDC's Disaster Management Procedure.

However, the EPRP is focused on construction and lacks integration with finalized operational-phase protocols. Additionally, the process safety assessment framework is not yet established and there is no designated lead, which limits systematic risk identification and oversight. OHS training is provided to all workers, but climate adaptation and heat stress protocols are incomplete. Incident documentation and reporting procedures exist, standardized root cause analysis tools are not consistently applied, and OHS performance indicators are not yet defined. Worker participation in incident reviews and continuous improvement mechanisms is limited. To ensure alignment with IFC PS 2 and EHS Guidelines, Orpower will perform a process safety assessment per ESAP #2 and update the EPRP as per ESAP 3. Additionally, Orpower will strengthen its existing OHS measures by defining and tracking operational OHS key performance indicators (KPIs), formalizing worker engagement mechanisms and introducing targeted protections against high temperatures. These protections will focus on heat stress prevention through measures such as hydration support, shaded rest areas, and adjusted work schedules. (ESAP #5)

Grievance Mechanism: Workers' grievances are addressed through one-on-one engagement with the HR team or the line manager. Orpower will document a workers' grievance mechanism formalizing grievance management practices already in place including, a clear articulation of how complaints are filed and received, timelines for responses, routes for escalation, options for anonymous complaints, incorporation of survivor centric responses to instances of sexual exploitation and abuse and sexual harassment (SEAH), training of staff tasked with responding to and resolving SEAH and Gender based violence (GBV) related complaints, and commitments to non-reprisal. The grievance procedure will be communicated to workers and supported by grievance logging or recording mechanisms. This mechanism will not impede access to other judicial or administrative remedies that might be available under the law (ESAP #6).

Third Party Workers and Supply Chain. Orpower is in the process of developing its contractor and sub-contractor management procedure. The main supply chain E&S risk for the project is OHS risks in the steam supply system.

As part of ESAP #1, the company shall improve on these procedures to include: (i) a Supplier Code to cover PS2 requirements, (ii) establish supplier screening procedures to identify specific supplier and contextual E&S risks in accordance with PS2 requirements, (iii) pre-contractual EHS requirements per the IFC contractor management GPN, which will include EHS due diligence, verification visits for high-risk contractors and suppliers; and (iv) the right to undertake monitoring and audit of contractor and supplier EHS performance.

PS3 Resource Efficiency and pollution prevention

Greenhouse Gas Emissions (GHG). With an annual output of 301,323 MWh, the project is expected to avoid approximately 139,086 tons of CO_2 equivalent (tCO_2eq) of GHG emissions per year.

Resource Efficiency. The project has adopted several resource-efficiency measures, such as the use of advanced geothermal conversion technology through reinjection of spent fluids, water sourcing from a dedicated industrial line, and material reuse and recycling. These measures were found to be consistent with EHS General, sectoral Guidelines and GIIP. Monitoring systems are in place to track resource use, and efficiency considerations are embedded in design and equipment selection. However, they lack clear efficiency targets, benchmarks, and documented improvement measures. These measures will be incorporated in the enhanced ESMP, as outlined under ESAP #1.

Pollution Prevention. Pollution prevention measures cover air emissions, noise, wastewater, stormwater, and soil/groundwater protection. These measures are in line with IFC requirements; however, gaps remain in

process safety assessments for air emissions and cumulative noise impact management.
Air dispersion modeling was conducted to assess ambient air quality risks and inform stack height optimization, impact mitigation measures, and monitoring protocols. The assessment found that prevailing winds may carry hydrogen sulfide (H_2S) emissions from the plant toward nearby communities such as Marigo and Rigogo, where ambient monitoring already showed exceedances of odor and occupational thresholds. While acute health risks from H_2S emissions at the plant are within acceptable limits, chronic exposure in nearby communities—particularly Rigogo—may pose long-term health concerns. Odor impacts are also likely under certain conditions, potentially leading to community nuisance. The project has implemented various measures to reduce these emissions, primarily hydrogen sulfide, through reinjection of non-condensable gases back into the geothermal reservoir, in line with IFC's EHS Guidelines. At the caldera level, hydrogen sulfide emissions monitoring is ongoing as part of GDC's environmental monitoring measures. Additionally, under GDC's leadership, the 3 operators have established a community engagement committee to handle concerns over cumulative / caldera level projects impacts. However, the project level air emissions management framework does not currently include provisions for process safety risks related to accidental releases. To ensure alignment with IFC PSs, and EHS General and sectoral Guidelines, the client will incorporate the outcomes of the process safety assessment—committed under ESAP #2—into its air quality management plan. This integration will strengthen the technical basis of existing controls and ensure that both routine and non-routine emissions are addressed through a risk-informed approach. (ESAP #7)
The facility utilizes reinjection systems to manage wastewater, thereby eliminating the need for surface discharge. As the steam supplier for the 3 IPPs, GDC is responsible for all subsurface works, including well design, drilling, and reinjection. Wells are constructed with multiple casings and cementing to isolate geothermal fluids from aquifers, and integrity is verified through pressure testing and ongoing monitoring. All geothermal brine and condensate are re-injected into deep, designated wells, below potable aquifers, eliminating the risk of mixing with groundwater.
At the surface, both GDC and Orpower use closed, above-ground pipelines for steam and brine transport, with no direct discharge to the environment. Brine is temporarily stored in HDPE-lined, fenced ponds during well testing or maintenance, then pumped back for reinjection. Regular inspections and groundwater monitoring around these ponds and reinjection sites ensure early leak detection, in line with the EHS General and sectoral Guidelines. Stormwater management measures also include structural controls and inspections. Brine reinjection and monitoring, coordinated with GDC, help prevent contamination.
Waste Management practices at the facility adhere to the waste management hierarchy –of avoidance, reduction, reuse, and recycling- to guide all waste–related activities. Dedicated storage areas for hazardous and non-hazardous waste are secure, segregated, and labeled, with measures in place to prevent exposure to weather and unauthorized access. Waste collection and disposal are outsourced to licensed third-party service providers, and chain-of-custody documentation is maintained to ensure traceability and accountability. Inventory logs are regularly updated to monitor waste volumes and types. Oversight of waste operators' compliance – including verification of permits and use of approved disposal sites– is conducted by the NEMA, ensuring adherence to national regulatory requirements, which are consistent with IFC EHS Guidelines.
During operations, the main noise sources at the plant are the steam turbine/generator (powerhouse), gas ejectors for non-condensable gas removal, cooling tower fans, vacuum pumps, the condenser, auxiliary cooling water pumps, and associated equipment such as valves and transformers. The turbine/generator is the dominant continuous source. Baseline noise levels in the area are already elevated due to ongoing geothermal field activities. The model results indicate that the incremental increase in noise from the Orpower plant alone is less than 3 dBA at 90 m (daytime) and 270 m (nighttime) from the plant boundary, and with all three plants operating, the maximum increase is less than 3 dBA at 390 m (day) and 610 m (night).
The closest noise sensitive receptors (NSRs) are at least 3 km from the plant, and modeled noise at these locations does not exceed Kenyan or IFC guideline limits (50 dBA day/35 dBA night for residential in Kenya; 55/45 dBA for IFC). The noise impact is highly localized, and minor compared to the existing baseline, and cumulative noise from all geothermal plants in the caldera remains within regulatory and IFC guideline limits at all modeled receptor locations. Orpower has implemented Engineering controls including acoustic cladding, low-noise equipment, silencers, and central placement of noisy equipment. Operational controls include limiting noisy activities to daytime, regular maintenance, and ongoing monitoring. To address cumulative impacts at the caldera level, short-term (24-hour to 1-week) sampling at facility boundaries and nearest NSRs is conducted jointly with GDC's team, with daily monitoring during operation, ensuring compliance and minimal community impact. The GDC-led caldera-level grievance redress mechanism, which includes representation from Orpower's E&S team, serves as a collaborative platform for receiving and resolving community complaints related to noise nuisance. Orpower will continue to strengthen its community engagement and complaint resolution mechanisms to ensure effective management of cumulative noise impacts.
The facility handles various hazardous materials, including hydrogen sulfide gas emitted from geothermal

operations, diesel and fuels used for machinery and backup power, lubricating oils and greases from equipment maintenance, paints, thinners, and solvents used in construction and maintenance, chemical containers and used oil from operational waste streams, and brine from geothermal extraction processes. Fuels and oils are kept in secure storage infrastructure that includes secondary containment, spill prevention measures, and impermeable flooring where applicable. Substitution of high-hazard substances is pursued where feasible, and further substitution opportunities will be assessed as part of the process safety assessment.

Cumulative impacts associated with odor, vibration, and thermal discharge have been assessed as negligible. However, mitigation measures have been developed to address any residual impact in line with IFC PSs and GIIP principles as outlined in the PS4 section. Light and visual impacts were assessed as minor and temporary.

PS4: Community Health & Safety and Security

About 60% of the land in the Caldera is public owned land comprising of the Menengai Forest which covers the Northern, Eastern and Southern parts of the Menengai Caldera. The main land use is geothermal power production followed by community use of the unalienated portions of the forest reserve, as aligned with the requirements of local laws on community based natural resource management. The Menengai Community Forest Association members use of the surrounding forest reserve includes beekeeping, forest plantation establishment, ecotourism, fuelwood collectors, tree nurseries, grazers, community water projects and curio shops. Private land uses include mixed-use small-scale farming and residential uses and plantation farming. The nearest communities to the project consist of the GDC residential camp within the Menengai Forest Reserve and some households within the private land portion of the Menengai Caldera floor and its rim.

Road Safety. Traffic risks were mainly during the construction phase due to transportation of modular plant equipment to the construction site and movement of staff to the caldera floor. To date, there are no road accidents involving project vehicles and communities - inside or outside the caldera. To address the risk of traffic accidents involving community members due to project vehicles on public roads, the project will implement driver training and vetting, ensuring that only licensed and experienced drivers operate vehicles. All vehicles will be maintained in a roadworthy condition with regular checks on brakes and lights. Heavy transport during routine or ad-hoc maintenance activities will be scheduled during off-peak hours to avoid school commute times, and community awareness initiatives will be conducted through the Stakeholder Engagement Plan (SEP), including potential road safety sessions in local schools. Vehicle safety guidelines, oversight and monitoring will align with the overall project Transport Management Plan and will incorporate vehicle inspection records, driver assessment and monitoring, community feedback and accident records. Key responsibilities will be held by the CLO, the Logistics/Transport Manager and the Safety Officer for incident response. Orpower will incorporate management of community road safety risks into its road safety plan (under ESAP #5) and incorporate oversight of vehicle suppliers into its supplier management procedures as discussed under PS 2 (under ESAP #1).

Odor Impacts and Concerns of Health Impacts. At caldera level, the use of closed-loop steam systems will reduce fugitive emissions into the atmosphere while the application of brine re-injection back into the wellfield is expected to further minimize surface release of odorous compounds, hence contributing to the minimization of odor impacts. As outlined under PS 3 odor impacts from release of hydrogen sulfide from geothermal steam emissions from both the wellfield and the 3 plants are negligible. However, residual odor impacts still remain, hence settlements adjacent the geothermal wellfield and plants are likely to periodically experience odor nuisance from the combined emissions from the geothermal wellfield and the 3 IPPs. Local communities have expressed concerns regarding air emissions and pollution associated with caldera activities.

As outlined under ESAP #7, Orpower will update and implement the Air Quality Management Plan to capture emissions from normal operations as well as accidental release and related EPRP components. In addition to these measures, the GDC Caldera level community grievance redress mechanism with representation from Orpower E&S team, will be used to receive and respond to community complaints on management of odor nuisance. Further details of actions by Orpower on these issues are provided under the Stakeholder Engagement Section.

Use of Security Forces. Orpower has contracted a security service provider who provides unarmed security personnel at the modular power plant. The updated ESMS requires training of project security personnel on appropriate conduct towards workers and affected communities, observance of the rule of law and avoidance of unnecessary use of force. It also requires establishment of mechanisms to allow community members to report concerns about security staff. Orpower will further update its ESMS to incorporate mechanisms to ensure that contracts for security personnel incorporate requirements on: (i) mechanisms for security service provider due diligence on past human rights violations; (ii) right to monitor and audit security contractor compliance with the project ESMS, including training of security personnel on applicable human rights requirements, (iii) assure cascading of the Contractor Code of Conduct to all security personnel on site; (iv) extension of community and worker grievance redress mechanisms to contractor security personnel, including the specific measures on sexual exploitation, abuse and harassment (SEAH). Orpower will

implement the requirements of the newly updated ESMS and provide evidence of its implementation. Training components will include coverage of appropriate use of force, conflict de-escalation skills, prevention of sexually transmitted infections (including HIV/AIDS) as well as prevention and response to GBV incidents and related complaints (ESAP #8).
PS6 Biodiversity Conservation and Sustainable Management of Living Natural Resources
The project is located entirely within the Menengai Crater, which forms part of the Menengai Forest Reserve (MFR), in the East African montane forests ecoregion. The landscape surrounding the crater is characterized by agricultural cultivation and human settlements, whilst the crater itself has been modified by existing adjacent geothermal projects and roads, as well as community uses including livestock grazing, wood collection and charcoal production.
As previously noted, the ESIAs and related specialist studies, including the vegetation study of the project area, have been completed. Although some gaps exist (e.g., relatively brief baseline surveys for vertebrates), these are co

Stakeholder Engagement

Orpower has been undertaking periodic stakeholder and community engagement since the early project development stages in 2016. Initial engagements in 2016 focused on consultation of communities as part of the ESIA studies for the project and continuously adjusted to allow for periodic engagement of communities in the primary zones of impact. Throughout these consultations, several key issues were consistently raised by stakeholders.
The local communities have raised concerns on the direct and cumulative impacts of the project including air pollution and fear over human health impact, air pollution and fears over acid rain, noise pollution, waste management, employment of non-locals and fears of labor influx impacts. Positive expectations included increased private land value due to the geothermal development activities, employment opportunities, local youth, improved infrastructure in the areas such as roads and water supply, anticipation of CSR projects that would benefit the community. As indicated under PS1, GDC established a caldera level community engagement committee to handle concerns over cumulative / caldera level project impact. The committee includes representatives from Orpower's EHS team as well as representatives of the local community.
At the project level, Orpower has recently developed a stakeholder engagement plan (SEP). To meet PS requirements, Orpower will update the SEP to capture mechanisms for responding to community complaints related to Orpower activities at the Caldera. The updated SEP will also outline modalities for jointly (with GDC, Globeleq & Sosian) responding to community concerns as discussed in this ESRS, including complaints on air pollution, sensitization on achievements in pollution management / prevention plans and alignment with collaboration interventions provided for in the Caldera level community engagement mechanisms. Orpower will update the SEP to provide commitments to SEP principles as aligned with PS requirements, including prohibition of reprisals and retaliation. Orpower will also provide mechanisms for monitoring and performance review on observance of the SEP principles. The SEP will also be updated to align with the requirements of the community GRM in line with the principles of the worker grievance mechanism discussed under PS2 on management of sexual exploitation, abuse and harassment (SEAH) related complaints and PS4 on Security Forces (ESAP #10).

Broad Community Support

Not Applicable

BCS Comment :

Local Access of Project Documentation

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Environmental & Social Action Plan (ESAP)

Is there an ESAP to be disclosed for this project?
Yes

Mitigation Measures / Environmental & Social Action Plan (ESAP)

SNo	Description	Anticipated Completion Date
1	Orpower will incorporate the outcomes of the process safety assessment—committed under ESAP #2—into its air quality management plan. This integration will strengthen the technical basis of existing controls and ensure that both routine and non-routine emissions are addressed through a risk-informed approach.	8/28/2026
2	Orpower will update the BMP to include a Reforestation Procedure and an Invasive Species Management Procedure, and confirm implementation timelines for planned activities, subject to formal agreement with KFS specifically for the area disturbed by OTTL during construction period and ensure restoration on project termination	8/28/2026
3	Orpower will (i) integrate findings from the formal process safety assessment into the EPRP and where critical, upgrade its engineering controls, and (ii) introduce real-time monitoring and feedback mechanisms to strengthen emergency response capacity.	8/28/2026
4	Orpower will enhance its ESMS by incorporating additional management programs and operational procedures. This will include a 'risk and impacts identification procedure' that aligns with PS1 principles. The company will also ensure that the O&M contractor updates and implements its ESMS in alignment with these improvements.	11/26/2026

5	Orpower will develop a HR policy and procedures manual in compliance with IFC PS 2. The policies and procedures will integrate measures for direct workers and identify the policy directives and mechanisms for oversight that apply to contracted workers and the supply chain per PS 2 requirements, including commitments to freedom of association and collective bargaining, non-discrimination and equal opportunity as well as prohibition of child and forced labour. As part of the HR manual, Orpower will outline the company's working terms and conditions, covering recruitment, induction, working hours and shift systems, overtime and overtime pay, OHS management, remuneration and benefits, rest days, paid and un-paid leave, performance review, statutory social welfare programs (e.g. pension, statutory health insurance and workers compensation schemes), training and capacity building, workers code of conduct, workers grievance mechanisms, management of confidential and sensitive HR data and information, disciplinary procedures and termination mechanisms (including dismissal, retirement and retrenchment). The manual will provide clear responsibilities for staff and company management and will be issued to staff at induction after appropriate sensitization, after which relevant records of issuance and sensitization will be kept by company management.	9/27/2026
6	Orpower will strengthen its existing OHS measures by defining and tracking operational OHS key performance indicators (KPIs), formalizing worker engagement mechanisms, and introducing targeted protections against high temperatures. These protections will focus on heat stress prevention through measures such as hydration support, shaded rest areas, and adjusted work schedules.	6/29/2026
7	Orpower will conduct a comprehensive process safety assessment which will include a Hazard Identification (HAZID), a Hazard and Operability Study (HAZOP), and a Quantitative Risk Assessment (QRA). The outcomes will inform the design and implementation of appropriate engineering safeguards and mitigation measures.	3/31/2026
8	Orpower will appoint a dedicated Process Safety Lead or engage a suitable consultant when needed for overseeing the development, execution, and continuous improvement of the process safety framework.	3/31/2026
9	Orpower will engage a qualified and experienced consultancy to conduct a comprehensive process safety assessment. This assessment will include a Hazard Identification (HAZID), a Hazard and Operability Study (HAZOP), and a Quantitative Risk Assessment (QRA). The outcomes will inform the design and implementation of appropriate engineering safeguards and mitigation measures. Additionally, Orpower will appoint a dedicated Process Safety Lead or engage a suitable consultant when needed for overseeing the development, execution, and continuous improvement of the process safety framework.	1/30/2026
10	Orpower will further update its ESMS to incorporate mechanisms to ensure that contracts for security personnel incorporate requirements on: (i) mechanisms for security service provider due diligence on past human rights violations; (ii) right to monitor and audit security contractor compliance with the project ESMS, including training of security personnel on applicable human rights requirements, (iii) assure cascading of the Contractor Code of Conduct to all security personnel on site; (iv) extension of community and worker grievance redress mechanisms to contractor security personnel, including the specific measures on SEAH/GBV. Orpower will implement the requirements of the newly updated ESMS and provide evidence of its implementation. Training components will include coverage of appropriate use of force, conflict de-escalation skills, prevention of sexually transmitted infections (including HIV/AIDS) as well as prevention and response to GBV incidents and related complaints	8/28/2026

11	Orpower will update the SEP to capture mechanisms for responding to community complaints related to Orpower activities at the Caldera. The updated SEP will also outline modalities for responding to community concerns as discussed in this ESRS, including complaints on air pollution, sensitization on achievements in pollution management / prevention plans and alignment with collaboration interventions provided for in the Caldera level community engagement mechanisms. Orpower will update the SEP to provide commitments to SEP principles as aligned with PS requirements, including prohibition of reprisals and retaliation. Orpower will also provide mechanisms for monitoring and performance review on observance of the SEP principles. The SEP will also be updated to align with the requirements of the community GRM in line with the principles of the worker grievance mechanism as discussed under PS2 on management of sexual exploitation, abuse and harassment (SEAH) related complaints and PS4 on Security Forces	6/29/2026
12	Orpower will document a workers' grievance mechanism formalizing grievance management practices already in place including, a clear articulation of how complaints are filed and received, timelines for responses, routes for escalation, options for anonymous complaints, incorporation of survivor centric responses to instances of sexual exploitation and abuse and sexual harassment (SEAH), training of staff tasked with responding to and resolving SEAH and Gender based violence (GBV) related complaints, and commitments to non-reprisal. The grievance procedure will be communicated to workers and supported by grievance logging or recording mechanisms. This mechanism will not impede access to other judicial or administrative remedies that might be available under the law	5/30/2026

Activity Log/Comments

Workflow Initiated by Christian Mulimbiyi Ngoy Ndombe (Draft Environmental and Social Review Summary) Oct 31, 2025 06:22 PM ET

Comments:

Admin Approved by Carlos Gabriel Arias Oct 31, 2025 06:26 PM ET

Comments:

CRU Member Approved and Appraisal Disclosure Initiated by Brenna Clerkin Lundstrom Oct 31, 2025 07:46 PM ET

Comments:
Client clearance obtained 10/31/2025

Supporting Documents

S.No.	Document Details