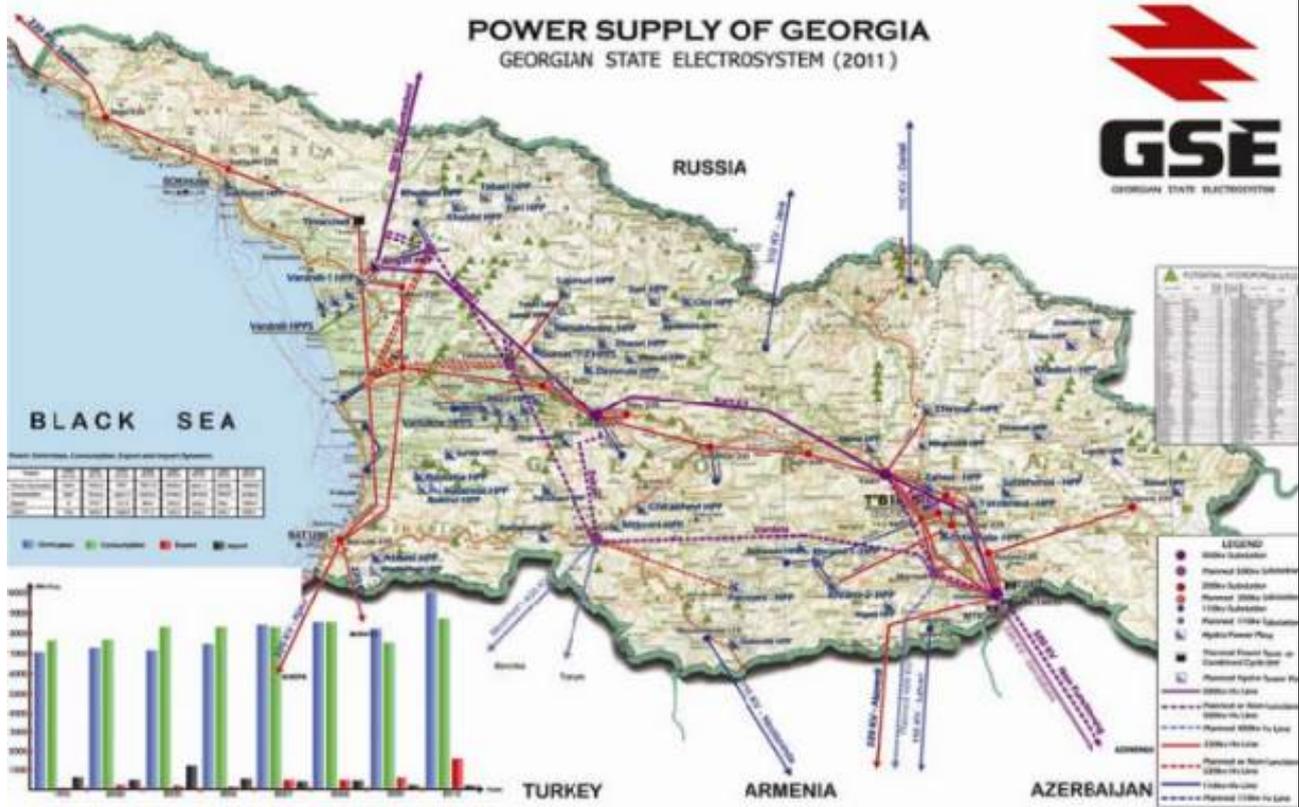


Georgian State Electricity Systems

RECONSTRUCTION OF AJAMETI-1, 2, SATAPLIA AND KOLKHIDA-1 POWER TRANSMISSION LINES AND MENJI, TSKHALTUBO, KUTAISI AND ZESTAFONI SUBSTATIONS

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN



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LIST OF ACRONYMS

ACSR	Aluminum Conductor Steel Reinforced
AP	Angle Point
dB	Decibel
EHS	Environmental, Health, and Safety
ESIA	Environmental and Social Impact Assessment
EMF	Electric and Magnetic Fields
ESMP	Environmental and Social Management Plan
ESRP AF	Electricity Supply Reliability Project - Additional Financing
ETNIP	Electricity Transmission Network Improvement Project
GDP	Gross Domestic Product
GPS	Global Positioning System
GRM	Grievance Redress Mechanism
HSEMS	Health, Safety, and Environment Management System
HSMP	Health and Safety Management Plan
HSMS	Health and Safety Management System
IFC	International Finance Corporation
kV	Kilo Volts
MW	Mega Watts
MoENRP	Ministry of Environment and Natural Resources Protection of Georgia
NGO	Non-Governmental Organization
OP	Operational Policies
OPGW	Optical Fiber Ground Wire
TL	Transmission Line
SC	Supervisory Consultant
PPE	Personal Protective Equipment
RAP	Resettlement Action Plan
RoW	Right of Way
SNCO	State Non-Commercial Organization
SS	Substation
ToR	Terms of Reference
USD	US Dollar
WB	World Bank

EXECUTIVE SUMMARY

The World Bank is supporting the Government of Georgia with the strengthening of the power transmission network of Georgia. Georgian State Electricity Systems (GSE) has replaced a 220 kV transmission Tskhaltubo-Senaki and rehabilitated Tskhaltubo and Senaki substations, and also constructed substation in Menji west Georgia. Under the World Bank-financed Transmission Grid Strengthening Project, it is proposed to rehabilitate Ajameti-1, 2, Sataplia and Kolkhida-1 220 kV transmission lines (TLs) and four high voltage substations connecting those lines: Tskaltubo, Kutaisi, Zestaphoni, and Menji. These TLs supply power to west Georgia and provide security of supply for entire country. The above mentioned existing TLs are around 50 years old and severely dilapidated, this jeopardizes the security and reliability of the power supply in the region.

The Project will finance equipment for the high voltage transmission lines and substations, GSE will carry out rehabilitation and upgrade works for lines and substations using in-house capacity. Environmental and Social Management Plan (ESMP) was prepared by GSE based on the design of the rehabilitation works. It will guide GSE's work team during field work on Ajameti 1, 2, Sataplia, and Kolkhida-1 TLs and Menji, Tskhaltubo, Kutaisi and Zestafoni substation.

The rehabilitation of the TLs will include installation of the double circuit towers and rehabilitation of the foundations, installation of new aluminum conductor steel reinforced (ACSR) conductors, placement of a new optical fiber ground wire (OPGW), earthing at each tower site, provision of the new connections to the National Grid via the Menji substation and new connections to the Tskhaltubo substation. All Works will be undertaken within the present corridors of these TLs (25m width). Rehabilitation of the substations will also be carried out within the current boundaries of the substations.

Development of the present ESMP implied identification of the expected impacts of the proposed reconstruction of Ajameti-1, 2, Sataplia, and Kolkhida-1 TLs and rehabilitation of substations on the environmental and social receptors, assessment of the magnitude of these impacts, and provision of measures for their mitigation commensurate with the national and international standards.

Based on the law of Georgia on the Environmental Impact Permitting (2007), works to be undertaken for the reconstruction of the subject TLs and substation do not require conduct of the environmental expertise and environmental permitting. However, Transmission Grid Strengthening Project is classified as environmental Category A as in addition to the above activities it finances construction of the new high voltage transmission line connecting high voltage substation in Akhaltsikhe and Batumi. The Project triggers the following safeguard policies of the World Bank: OP/BP 4.01 Environmental Assessment, OP/BP 4.04 Natural Habitats, OP/BP 4.36 Forests, OP/BP 4.11 Physical Cultural Resources, OP/BP 4.12 Involuntary Resettlement, and OP/BP 4.37 Safety of Dams. However works to be undertaken for rehabilitation of Ajameti 1, 2, Sataplia and Kolkhida-1 TL and substations carry very modest environmental and social risks and only the requirements of OP/BP 4.01 are applicable to them.

GSE will implement works for the reconstruction of TLs and substations and will be responsible for all aspects of their construction and operation, including compliance with the national environmental and social legislation and the World Bank's safeguard policies. The

Ministry of Environment and Natural Resources Protection of Georgia (MoENRP) will supervise environmental compliance during construction and operation activities of the TL. Ministry of Energy will coordinate with GSE during operation activities of the TLs.

The TL corridors are located in west Georgia which is characterized with a warm and humid climate. The main rivers in the TL corridor area are Rioni, Tskheistkali, and Tsivi, including their tributaries. These are rain-fed rivers. High water season lasts from March till June, followed by a stable and low water dry period. Short and intensive floods are observed in September and October, depending on the amount of precipitation.

Georgia is remarkable for the diversity of its flora both in the South Caucasus and the Caucasus region in general. However the TLs' corridor does not pass through areas with high biodiversity and natural habitats. TLs' corridor lies in a pretty flat terrain where grass and shrub vegetation prevail. Main type of land use is for cattle grazing.

Environmental and Social risks of the TL and Substation rehabilitation works will be modest and confined to bad construction practice that workers may demonstrate. More specifically, dumping of household waste and fragments of construction waste into surface water bodies while works near the waterways, and improper collection of household waste is possible. Damage to vegetative cover will occur if construction vehicles and machinery does not move strictly along service roads and surface water pollution may result from washing/servicing vehicles in the river beds. Major types of construction waste will be metallic and concrete parts of removed old towers. GSE takes responsibility for transporting this waste to the nearest power substations and keeping it there in storage for potential re-use. If small amounts of concrete waste and excess material from excavation works are to be disposed, the location of permanent placement of this non-hazardous waste will be agreed with local authorities and regional branch of the MoENRP. Collected household waste will be disposed by local municipal service providers based on a preliminary agreement.

Sataplia protected areas are located close to the TLs' corridor, however the corridor does not cross their boundaries and no impacts are expected.

There are no known elements of physical cultural heritage in the TL corridor and the likelihood of chance finds is lesser than average in Georgia because earth works will be of a modest scope and confined to the corridor where excavation for the installing the existing towers had already been undertaken.

Rehabilitation of Ajameti-1, 2, Sataplia, and Kolkhida-1 TLs and substations Tskaltubo, Kutaisi, Zestaphoni, and Menji will not require land take. All works will be undertaken within the existing corridor, which is formally registered under the GSE ownership. The Residential houses and other structures within the project area are located 200-300 meters away from the TLs. A need for temporary use of communal pastures or private land plots during construction works is not expected, however in case of its occurrence GSE will follow Resettlement Policy Framework of the Transmission Grid Strengthening Project and will compensate for temporary land take or temporary restriction of land use in conformity with the OP/BP 4.12 and the RPF.

1. Introduction

Despite significant progress to date, Georgia's energy sector has not fully recovered from the devastation caused by the ravages of civil war in 1993, lack of regular maintenance and scant investment in physical infrastructure. New vulnerabilities have surfaced after the 2008 conflict with Russia, especially with regard to energy production and transit. The task of stabilizing and rebuilding Georgia is immense and requires the support of the donor community, as notably highlighted in the post-conflict Joint Needs Assessment.

The existing 220 kV Sataplia power transmission (Tskaltubo substation – Kutaisi substation) and 22kv Ajameti-1, 2 transmission lines (Kutaisi substation – Zestaponi substation) were constructed in 1980th and were under the operation; however, during the Civil War in 1991 – 1993 the system was totally destroyed and therefore requires an immediate and comprehensive rehabilitation, reconstruction in order to (i) bring the infrastructure back to an acceptable level of technical integrity, (ii) secure the safe and reliable supply of electricity to the west Georgia, and (iii) improve GSE's capacity to sustain and further develop the operational and financial performance of the System. This will improve security of supply of the entire electricity system of Georgia.

Rehabilitation of the Ajameti-1, 2, Sataplia and 220kV Kolkhida-1 transmission lines (TLs) is loaded with 225-250 MW, in case of 500kV Imereti TL failure. In consideration of the current technical condition of this transmission line, the maximum allowable current is 405 ampere, which is approx. 125-140 MW transmission capacity equivalent. For attaining the objective of improvement of the reliability of the system, this datum should be increased up to 300-310 MW, which is equivalent of 1000-1050 ampere. 220kV Ajameti-1, 2, Sataplia and Kolkhida-1 TLs connect 220kV Menji substation and 220kV Kutaisi substation. To achieve improved throughput of the above mentioned lines, Ajameti line will be upgraded from double to triple circuit, Sataplia line will be upgrade from single to double circuit, Kolkhida line and four high voltage substations connecting those lines; Tskaltubo, Kutaisi, Zestaponi, and Menji will be rehabilitated.

Georgian State Electricosystems (GSE) is the implementing entity for Transmission Grid Strengthening Project and will carry out rehabilitation and upgrade of the lines and substations using its in-house capacity. The Project will finance equipment for the lines and substations. The estimated cost of the proposed works is 10.000.000 USD and they are expected to complete in 2018. GSE will be responsible for the operation of these TLs and substations upon completion of rehabilitation works.

Macroeconomic and geopolitical importance of the proposed rehabilitation of Ajameti-1, 2, Sataplia, and Kolkhida-1 TLs and substation is that it will:

- Increase electricity supply to the West Georgia;
- Support development of the Black Sea coastline resorts and recreational areas;
- Raise energy security of Georgia;
- Ensure safe and reliable supply of the electricity to the European Union.

2. Objectives and Methodology of Environmental and Social Impact Assessment

The objectives of the Environmental and Social Management Planning for the rehabilitation of the Ajameti-1, 2, Sataplia and Kolkhida-1 TLs and substations Menji, Tskhaltubo, Kutaisi and Zestafoni were to identify and assess nature and magnitude of the expected environmental and social impacts of this activity and to provide measures for their mitigation commensurate with the national and international standards.

General overview of biophysical environment in the TLs' corridor and substation locations were carried out through a desktop study, and a field surveys were conducted by the environmental and social experts. This implied walk-through along the corridor of the existing TLs and substation location within which the new activities will be conducted. For the evaluation of possible environmental and social impacts, the available satellite maps were also used. Drawings and other data from the existing TLs and substations were a useful input for the Environmental and Social Management Plan (ESMP). Additional information was gathered through meetings with the representatives of the Ministry of Energy and Ministry of Environment and Natural Resources Protection of Georgia (MoENRP).

Public consultations on the draft ESMP will be conducted in accordance of the World Bank requirements and the received feedback will be incorporated into the finalized report. Draft ESMP report will be disclosed in Georgian and English languages through the GSE's web page. Consultation process will be open for all citizens, however individual types of stakeholders will be additional targeted to ensure their full participation. These will include the central, regional, and local government officials, staff of relevant line ministries, and people who live in close proximity of the TLs' corridor and substation locations. Public feedback will be received during a stakeholder consultation meeting to be held closer to the TL's corridor, as well as in written through the provided mailing addresses.

3. Legal and Institutional Framework

The environmental legislation of Georgia is undergoing fundamental changes in the course of EU approximation. The law of Georgia on Environmental Impact Permitting (2007) is one of those pieces of legislation that are being revised. Present iteration of this law lists out types of activities which are subject to Environmental Impact Assessment (EIA). According to this law, construction of TLs of 220 kV and higher voltage are subject to EIA and environmental permitting, however rehabilitation of such TLs is not subject to the EIA procedures. However, based on the recent decision of the Government of Georgia, infrastructure which had been constructed in the past without environmental assessment of project documentation and without environmental permitting, has become subject to the environmental audit. Ajameti, Sataplia and Kolkhida TLs are among such pieces of infrastructure. As conduct of environmental audit would take longer, GSE applied to the MoENRP and received consent to carrying out rapid ESIA of these TLs based on the urgency of their reconstruction. ESIA's were carried out following the national standards currently in force. Environmental permit to reconstruct and operate Ajameti TL was issued following short-track simplified approval process and a full ecological expertize was applied to Sataplia TL. Similar procedures will be applied to the Kolkhida TL, the national deadline for retroactive environmental expertize of the existing infrastructure being July 1, 2017.

Transmission Grid Strengthening Project is classified as environmental Category A and triggers the following safeguard policies of the World Bank: OP/BP 4.01 Environmental Assessment, OP/BP 4.04 Natural Habitats, OP/BP 4.36 Forests, OP/BP 4.11 Physical Cultural Resources, OP/BP 4.12 Involuntary Resettlement, and OP/BP 4.37 Safety of Dams. However works to be undertaken for rehabilitation of Ajameti 1, 2, Sataplia and Kolkhida-1 TL carry very modest environmental and social risks and only the requirements of OP/BP 4.01 are applicable to them.

World Bank/IFC General EHS Guidelines and in particular Guidelines for Electric Power Transmission and Distribution, 2007 also apply. Decree of the Government of Georgia #366, 2008, on the safety zones for electric networks defines a distance of 25 m for 220kV TLs counted from the outer conductors as a buffer zone. The World Bank Group uses IFC Performance Standards to manage human exposure to electric and magnetic fields. These standards call for respecting the limits established by the International Commission on Non-Ionizing Radiation Protection (ICNIRP), which are as follows:

ICNIRP (1998) exposure guidelines for general public exposure to electric and magnetic fields		
Frequency	Electric Field (V/m)	Magnetic Field (μ/T)
3-150 kHz	87	6.25
10-400 MHz	28	0.092
2-300 GHz	61	0.2

ICNIRP exposure limits for general public exposure to electric and magnetic fields		
Frequency	Electric Field (V/m)	Magnetic Field (μ/T)
50 Hz	5000	100
60 Hz	4150	83

Reconstruction and operation of Ajameti-1, 2, Sataplia and Kilhida-1 TLs and substations will comply with both standards – the national regulation and the limits established by ICNIRP.

GSE will perform Health and Safety Activities in accordance of the World Bank Environmental, Health and Safety Standards as referred in the following document; http://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/ifc+sustainability/our+approach/risk+management/ehsguidelines as well as all the guidelines and requirements mentioned under this chapter and entire document.

GSE is the implementing entity for the Transmission Grid Strengthening Project and will carry out rehabilitation of Ajameti-1, 2, Sataplia and Kolkhida-1 and substations. This entity will be responsible for all aspects of this activity and for the operation of the rehabilitation TLs and substations too, including its compliance with the national environmental and social legislation and the World Bank safeguard policies. Division of International Project Management (DIPM) will be responsible for implementation of the project. Environmental Manager of the Division will be responsible for coordinating implementation of the ESMP through the Environmental and Social specialist. DIPM team will be responsible for monitoring and reporting to GSE management and the World Bank.

MoENRP, through its Department of Supervision, will be responsible for supervision of the construction activities and in case of non-compliance with the national environmental legislation, will issue a violation protocol to be followed by penalty and corrective actions. The same Department of the MoENRP will supervise TL's and substation operation.

4. Project Description

The proposed rehabilitation will add one circuit to the existing 220 kV Sataplia TL (Tskaltubo substation – Kutaisi substation) and 220 kV Ajameti 1, 2 lines (Kutaisi substation – Zestaponi substation). Rehabilitation of Kolkida-1 TL will imply replacement of the existing towers and wiring, which are in a bad condition. All TLs will remain within existing right of way (RoW). Works to be undertaken include construction of 60 new double circuit towers for Ajameti and Sataplia TLs, and stringing of the new line for Kolkida-1 and installation of 197 foundation installations.

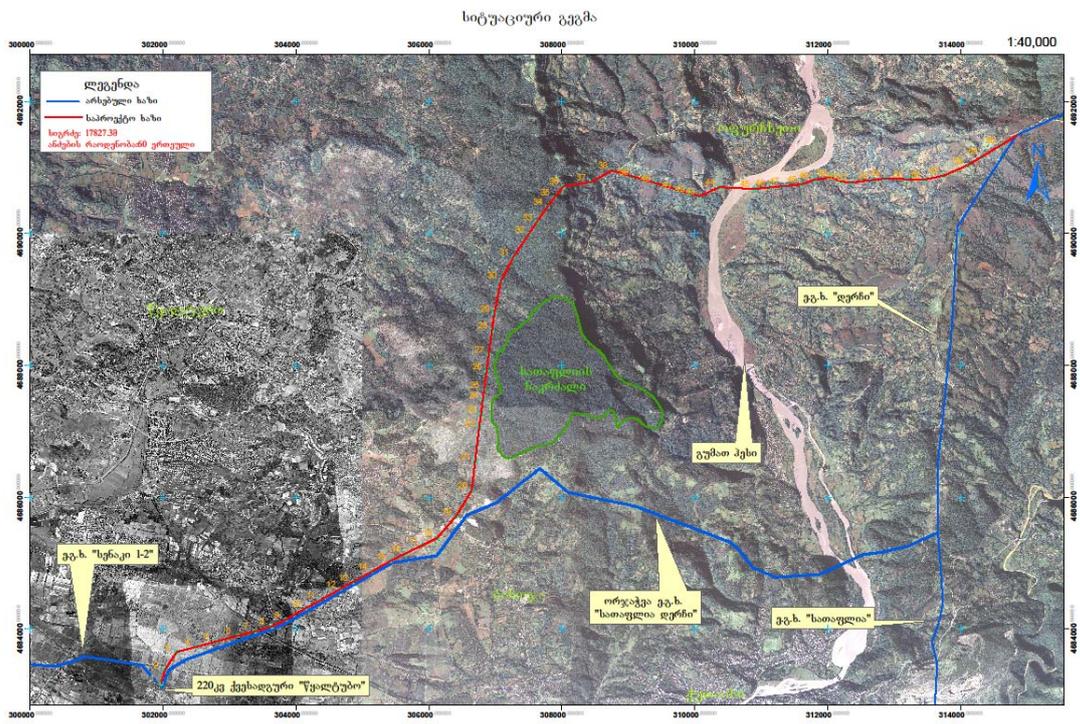
The route of the TLs runs in the west Georgia – starting from 220kV Menji substation in Samegrelo Region, Senaki, crossing Senaki, Abasha, Imerety region, including the municipalities of Samtredia, Terjola, Tskaltubo, Kutaisi, up to 220kV Kutaisi substation. Besides the small rivers, it crosses rivers Abashistskali, Tskhenistskali, Tekhura and Rioni. The route of the line mainly crosses plain territory.

Several sections of the line were rehabilitated during 2000-2004-2006 in parallel with World Bank financed Electricity Market Support Project. However, the reconstruction served for the elimination of several emergency sections only and 30 towers were replaced and not the capacity increase of the line.

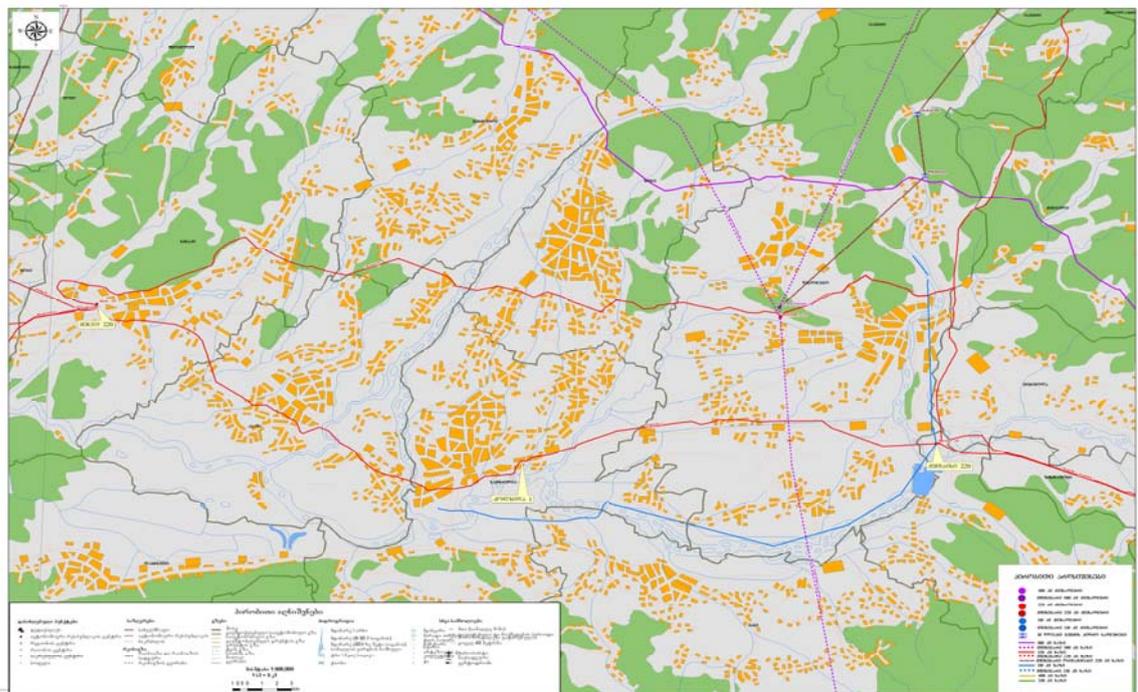
For the first section of 220 kV Ajameti-1, 2 TLs, the existing Ajameti-1 line will be replaced with newly installed double circuit line, while for the remaining section, the existing Ajameti-2 line, which run in parallel with Ajameti 1, will be replaced with newly installed double circuit line. For both sections, the existing single circuit towers will be demolished and the new double circuit towers will be installed at spots adjacent to existing towers within the existing corridor as is the case with Sataplia TL. At the point where the existing Ajameti-1 and Ajameti-2 are close, newly installed conductors will be connected each other.

The route of the TLs runs in the west Georgia – starting from 220kV Menji substation in Samegrelo Region, Senaki, crossing Senaki, Abasha, Imerety region, including the municipalities of Samtredia, Terjola, Tskaltubo, Kutaisi, up to 220kV Kutaisi substation. Besides the small rivers, it crosses rivers Abashistskali, Tskhenistskali, Tekhura and Rioni. The route of the line mainly crosses plain territory.

The rehabilitation of the substation will be carried out within the existing boundaries of the substations using the spare areas. No transformers, batteries will be replaced or rehabilitated. No hazardous materials will be either added or replaced as a part of substation rehabilitation works.



Map 1 - General location of the Ajameti-1, 2 and Sataplia TL System



Map 2 - Kolkhida-1 TL

5. Baseline Data

5.1 Physical Environment

Ajarneti-1, 2, Sataplia and Kolkhida-1 TLs are located in West Georgia in Imereti and Samegrelo Region. Starting from East the 220 kV TL runs across the low mountainous plain landscape next to Rioni, Tskhaltsitela and Kvirila river terrain. The TLs crosses Rioni River, passes villages Argveta, Sviri, Rodiauli, Tskhenta Tskharo, Ajarneti and Sarbevi. The line crosses further plains, crosses several valleys. The line continues down to the and ends in Tskhaltubo-Tskhaltubo SS where it continues to Kolkhida-1 TL. The route of the Kolkhida TL runs in the west Georgia starting from Samegrelo-Imereti region. The line starts from 220kV Menji substation in Samegrelo Region, Senaki, crossing Senaki, Abasha, Imereti region, including the municipalities of Samtredia, Terjola, Tskaltubo, Kutaisi, up to 220kV Kutaisi substation. Besides the small rivers, it crosses rivers Abashistskali, Tskhenistskali, Tekhura and Rioni. The route of the line mainly crosses plain territory.

The climate of Imereti Region is relatively humid. Annual precipitation is 500 - 800 mm. Summers are long, hot and sunny. The winters are not very snowy, however in foothills lasting from October until April. Prevailing wind is Western, sometimes Northern and North-Western. The region has a complex geological structure due to its location, which is in the northwestern part of tectonic zone of Small Caucasus.

Geology within the area of TL route and substation location is composed of the quaternary layers, in particular middle and upper quaternary sediments. The upper granular soil is the alluvium brought down by the rivers from the Caucasus, the lower soil is mostly covered by the Black Sea sediments, among which according to faunistic signs can be distinguished old Black Sea, new Euxinic, old Euxinic, Karangatian and Chaudian (Late Pleistocene) deposits/layers. Modern Quaternary alluvial sediments are observed upstream of river gorges where they form riverbeds and terraces. The soil-forming sediments are represented by alluviums, clay, sea sediments which are merged with lake clays.

Rivers located in proximity to the TL corridor are Rioni, Tsivi, Kvirila, Tskhaltsitela, Dzirula, Cholabui, Ajamura and their tributaries. These rivers are mainly fed by rains. High water season lasts from March until June, followed by a stable and low water dry period.

5.2 Biological Environment

Georgia is remarkable for the diversity of its flora both in the South Caucasus and the Caucasus region in general. The area of the subject TLs' corridor falls within flat and mid-zone of mountains, occurring at altitudes between 500 m and 2,100 m in the north. The territory is mainly characterized with degraded forests in the study area include a number of evergreen and deciduous trees. Some parts of the RoW down to the south are more marshlands, bushes with wildflowers. The territory is mostly abandoned inhabiting degraded forests, hardy shrub associations.

Close to the RoW, in approximately 5 km, there are protected areas of Sataplia. They comprise of the state reserve, a managed reserve, and several natural monuments. Unique karstic caves, flora and fauna are under protection in Sataplia.

Because of the years of anthropogenic impact, the TL corridor and substation locations is not inhabited by large mammals. Leisler's bat (*Nyctalus leisleri*) and the following bird species occur in the area of the TL corridor: *Common buzzard (Buteo buteo)*, Eurasian jay (*Garrulus glandarius*), *Hooded crow (Corvus cornix)*, Great tit (*Parus major*), Eurasian blue tit (*Cyanistes caeruleus*), European robin (*Erithacus rubecula*), Common blackbird (*Turdus merula*), Long-tailed tit (*Aegithalos caudatus*), Common chaffinch (*Fringilla coelebs*), House sparrow (*Passer domesticus*); and *Eurasian tree sparrow (Passer montanos)*. Amphibians are represented by Eurasian march frog (*Pelophylax ridibundus*). None of them are rare or endangered (not on the IUCN Red List of the Red List of Georgia).

5.4 Existing Infrastructure

The line is located near Tskhalubo, Kutaisi, Zestafoni and Menji SSs, and Tbilisi-Senaki E-60 highway.

5.5 Land tenure and Use

The rayons where Ajameti-1, 2, Sataplia and Kolkhida-1 TLs and substations have a population of 105,639 people for a territory of 3,799 km² and a population density of 61.8 persons per km². The settlement structure is concentrated with most of the people living in towns and villages. Large parts of the investigation area are uninhabited and represent state lands, which mostly are grazing lands.

Main type of land use is agriculture, which is mainly represented by subsistence farming. TLs pass through Kutaisi, Tskhaltubo, Terjola, Samtredia, Abasha, Senaki rayons. The settlements along the line are located 250-300 meters from the central line from the RoW which is 25 meters wide. The settlements are located around 300-350 meters away from the edge of the RoW. The lands located around the towers are already within GSE ownership.

There are no farms, or any agricultural activities along the ROW. The land is mostly used for grazing activities.

There are no known cultural heritage sites located along the TLs' corridor and substation locations

6. Analysis of Alternatives

The following alternatives to the proposed rehabilitation of Ajameti-1, 2, Sataplia and Kolkhida-1 TLs were considered:

Alternative 1: “no action” scenario

Under the “No Action” alternative the TLs and substation would not be reconstructed and the existing infrastructure would continue to deteriorate. As things stand now, subject TLs cannot transmit required quantities of electricity to the western part of Georgia and the emergency failures occur. Reliability of energy transmission from the Enguri basin to the east part of the country is also low. Without upgrading of the subject TLs, development of Black Sea touristic zone and overall economic development of West Georgia will be constrained. Thus, reconstruction of Ajameti-1, 2, Sataplia and Kolkhida-1 TLs and substation is considered of high importance and “no-action” alternative is rejected.

Alternative 2: Reconstruction within present RoW

Under this scenario the existing TLs will be reconstructed within the present RoW and substations within the existing location which means that environmental footprint of these TLs will not expand, there will be marginally little impacts on land use and on the other infrastructure existing within the area, no encroachment on the territory of Sataplia protected areas will be required, and no need for clearing of high-growing vegetation will be needed. Because of these minimal expected negative impacts on the natural and social environment, alternative 2 is selected.

Alternative 3: Construction of New TLs and Substations in an Alternative Corridor

Alternative routing of the TLs would allow to shorten their overall length. This could bring down the cost of building TLs as well as of their operation and maintenance. Relocation on the substation will required utilization of the new green land, this will cause higher environmental impacts and there would be a need for land take with the associated payment of compensations. Mitigation measures under this scenario would outweigh the potential savings and residual environmental impacts would be significant. Hence this alternative had been discarded pretty early in the process of conceptualization of the proposed works.

7. Environmental and Social Impacts and Their Mitigation

7.1 Environmental Impacts and their Mitigation during Construction

Flora and Fauna

Impact

Most of the land used by TL corridor is a grazing land and with grass and the scarce shrub vegetation. The substation lands are already existing and utilized. The land may be damaged in case of construction vehicles and machinery move in the area in an uncontrolled manner, getting off the existing service roads which are sufficient for undertaking of the planned rehabilitation works. Occurrence of fauna is confined to common insects, amphibians, birds and bats. If construction activities are confined to the discrete tower locations and the existing service roads, no considerable disruption of animal life will result from them.

Mitigation

Restrict movement of vehicles and machinery off the existing service roads.

Soil

Impact

There are existing service roads which will be used during construction and no impacts on soil through deterioration of grass cover and compaction is therefore expected provided that construction workers use these access roads and restricts uncontrolled movement of vehicles/machinery. There will be a need for excavation works for the erection of new towers and removal of old ones. This may cause loss of topsoil, unless removed separately and then used for reinstatement.

Soil may be polluted with oil and lubricants in case of poor technical condition of construction vehicles/machinery and in case of their servicing on-site. No impact on soils is envisaged under the substation rehabilitation.

Mitigation

Restrict movement of construction vehicles and machinery off the existing service roads.

Keep construction vehicles and machinery in good technical condition; restrict their servicing on-site.

Surface Water Bodies

Impact

Reconstruction of TLs will imply river crossing and works will be undertaken in an immediate proximity to the surface water bodies. The only risk to the pollution of river bed and the water is from discarding household waste and fragments of the construction waste to the river by construction workers. No other sources of pollution are expected. No river crossing are envisages under rehabilitation of the substations.

Mitigation

Provide household waste containers on site and restrict littering by construction workers.

Generation of Solid Waste

Impact

Household waste will be generated as a result of construction workers presence in the corridor. Likelihood of workers dumping waste around the site is high due to generally behavioral pattern in regards to waste handling in Georgia.

Construction waste will mainly comprise of metallic and concrete parts of the replaced towers. The volumes of this waste will be significant. No hazardous wastes will be generated during rehabilitation of the substations.

Mitigation

Provide household waste containers on site and restrict littering by construction workers.

Remove construction waste to the closest SSs owned by GSE for future re-use.

Nuisance to Local Residents

Impact

TLs pass in the immediate proximity to several villages. Noise and dust generated from the operation and construction vehicles and machinery may cause nuisance to local residents.

Episodically, construction workers may be exposed to excessively high noise levels.

Mitigation

Respect working hours in proximity to residential areas.

Ensure workers wearing personal protective gear against noise if they may be under the risk of exposure to noise levels higher than 80 dB (A).

7.2 Environmental Impacts and their Mitigation during Operation

Landscape

Impact

Proposed works imply dismantling of the existing tower which have to be replaced. Hence the total number of towers will not change significantly and the visual impact on the landscape will be minimal. Visual impact may be caused by basements of removed towers if left on-site. No visual impacts from substations since these are already existent substation.

Mitigation

Basements of replaced towers will be removed and transported to the closest SSs owned by GSE.

Soil

Impact

Growing trees and shrubs within the ROW have to be cut from time to time to keep the minimum safety clearance of 7.5 m between vegetation and the conductor cables. Herbicides may be applied for keeping vegetation away from the corridor. No tree cuttings required in substation areas.

Mitigation

Herbicides will not be used for vegetation control at any time.

Fauna**Impact**

The corridor is not in the way of bird migration routes. Locally occurring species of sparrows and bats are not endangered and are not listed in the Red Book of Georgia. No information is available on the death of bird and bat specimen as a result of colliding with the existing TLs and substations. Hence no impacts on fauna are likely during operation phase.

Mitigation

N/A

Noise**Impact**

The intensity of corona noise is influenced by weather conditions. Rainfall and fog will increase the noise level but these weather conditions do not dominate the weather pattern in the TL corridor and substation.

Mitigation

N/A

Exposure to Electric and Magnetic Fields**Impact**

At present there are no residential buildings along the TL corridor that would fall under restricted areas of electro-magnetic impact on humans. Even at the stage of detailed design, when exact locations of all new towers will be specified, issues with a distance from human settlements are not expected to arise. The only risk to the human health may arise in case of improper issuance of construction permits in future, or informal settling of people within the buffer zone.

Mitigation

No construction permits shall be issued within the buffer zone of the TLs, substation and squatters must be restricted from informal settling within this zone.

7.3 Social Impacts and their Mitigation during Construction**Land use (Agriculture)**

Impact

A need for using communal pastures and private lad plots for access or for temporary storage of construction materials and waste is not expected, however individual cases of such occurrence may not be fully excluded either.

Mitigation

In an unlikely case of temporary use of communal or private land or temporary restriction of access to these lands for their owners/users, GSE will rapidly develop abbreviated Resettlement Action Plan and compensate affected people according to the RPF of the Transmission Grid Strengthening Project.

Health and Safety of Workers

Impact

Construction workers will be exposed to regular risk of accidents from operating construction vehicles and machinery. In addition, there will be risk related to work on heights and the risk of electric shocks.

Mitigation

Personal protective gear must be issued to construction workers and its use must be enforced.

Employees operating heavy machinery and working on stringing/testing of the wiring must be through a specialized training. Health and life insurance should also be provided.

First aid medical kits must be held at work sites at all times and contact information of the closest health clinics must be readily available.

Existing Infrastructure

Impact

TLs to be reconstructed pass over Kutaisi-Tskaltubo section of E-60 Highway. Stringing works may disrupt vehicle movement on this highway for a short period of time.

Mitigation

Warning signs will be installed on the roads and active traffic management will be provided with the help of flagmen, as required.

Use of Local Workforce

GSE will hire local workforce for undertaking simple tasks. This will contribute to much needed monetary income in remote rural areas and towns, where the industrial basis has eroded. However the income generation opportunity is not long term.

7.4 Social Impacts and their Mitigation during Operation

Land Use

Impact

Land are outside the tower locations can be used for agriculture without restriction. Maintenance works are not expected to have impact on land use in case service roads are used and no unmanaged movement of vehicles is allowed.

Mitigation

Disallow uncontrolled movement of vehicles and machinery deployed for TL and substation maintenance.

Confine all maintenance works to the existing service roads.

8. Environmental Monitoring

GSE, in the capacity of the Transmission Grid Strengthening Project and the performer of physical works on Ajameti-1, 2, Sataplia and Kolkhida-1 TLs, will carry full responsibility for the environmental and social compliance of the proposed works. Present ESMP carries an environmental and social management matrix comprising of the mitigation plan and monitoring plan provided in table format. Environmental Mitigation Plan is intended for the use by GSE's field team performing physical works, while Environmental and Social Monitoring Plan will be used by GSE's Environmental Specialist for overseeing compliance with the prescribed mitigation measures. Environmental Specialist will report to GSE management and the World Bank on the environmental and social performance of works for the rehabilitation of Ajameti 1, 2, Sataplia and Kolkhida-1 TLs and substations.

MoENRP, through its Department of Supervision, will exercise its mandate of a state control over adherence to the Georgia's environmental legislation throughout the construction and operation of the TLs and substations.

Environmental and Social Mitigation Plan

No	Type of Activity	Location	Type of Impact	Mitigation Measure(s)	Responsible Party
CONSTRUCTION PHSE					
1	Movement of construction vehicles and machinery	Entire length of TLs	Damage of grass vegetation and soil compacting	Restrict movement of construction vehicles and machinery to the existing service roads	GSE
2	Works near surface water bodies	River crossings	Pollution of river bed and water	Provide household waste containers on site and restrict littering of river bed	GSE
3	Stringing of cables over the Zestaponi-Kutaisi road section	Highway crossing	Disruption of traffic on the highway	Install warning signs on the road. Provide active traffic management with the help of flagmen, as required	GSE
4	Generation of the solid waste	Entire length of the TL's	Waste dumping around the site	Provide household waste containers on site and restrict littering at work site Transport removed towers and foundations to the closest substations owned by GSE	GSE
5	Nuisance to local residents	Near populated areas	Noise and dust generated from the operation of construction vehicles and machinery	Respect working hours in proximity to residential areas. Ensure workers wearing personal protective equipment against noise if they may be under the risk of exposure	GSE

No	Type of Activity	Location	Type of Impact	Mitigation Measure(s)	Responsible Party
6	Exposure of workers to work site risks	Entire length of TLs	Health damage due to exposure to high levels of noise. Work site accidents and casualties	Issue personal protective gear to construction workers and enforce its use. Ensure that employees operating heavy machinery and working on stringing/testing have been through a specialized training. Provide health and life insurance to workers. Keep first aid medical kits at work sites at all times and have contact information of the closest health clinic readily available.	GSE
OPERATION PHASE					
1	Vegetation control under TLs	Entire length of TLS	Pollution of soil with pesticides	No use of pesticides for vegetation control	GSE
2	Replacement of towers	Tower locations	Deterioration of visual appearance of the landscape	Remove basements of replaced towers and transport to the closest substations owned by GSE	GSE
3	Informal settling of people within the buffer zone	Entire RoW	Exposure to health-threatening levels of impact from electric and magnetic fields	No construction permits issued within the buffer zone of the TLs and squatters must be restricted from informal settling within this zone.	State regulatory and law enforcement bodies
4	Regular operation and maintenance of TLs	Entire length of TLs	Work-site accidents and casualties	Issue personal protective gear to construction workers and enforce its use. Provide health and life insurance to workers. Keep first aid medical kits at maintenance sites and have contact information of the closest health clinic readily available.	GSE

Environmental and Social Monitoring Plan

Activity / Impact	What (Is the parameter to be monitored?)	Where (Is the parameter to be monitored?)	How (Is the parameter to be monitored?)		When (Define the frequency / or continuous?)	Who (Is responsible for monitoring?)
			Method	Indicator		
CONSTRUCTION PHASE						
Damage to vegetation and soil compacting from unregulated movement of vehicles and equipment	Movement of vehicles and construction equipment	Entire length of TLs	Visual inspection	Vehicles moving strictly along the existing service roads	During construction works	GSE
River bed and water pollution due to dumping of household waste and fragments of construction waste into it	Waste management	River crossings	Visual inspection	Trash containers provided at works sites No litter visible in the river bed	During construction works	GSE
Traffic disrupted as a result of stringing of cables over Kutaisi-Zestaponi road section	Traffic management	Road crossing	Visual inspection	Traffic regulated and no road accidents occurring in result of stringing works	During stringing cables over Kutaisi-Zestaponi road section	GSE Patrol Police
Environment pollution from improper management of generated household and construction waste	Waste management	Entire length of TLs	Visual inspection	Trash containers provided at work sites TLs' corridor clean of household and construction waste Removed towers and foundations placed for storage at substations owned by GSE	During construction works	GSE

Activity / Impact	What (Is the parameter to be monitored?)	Where (Is the parameter to be monitored?)	How (Is the parameter to be monitored?)		When (Define the frequency / or continuous?)	Who (Is responsible for monitoring?)
			Method	Indicator		
Nuisance of local residents due to noise-generating works	Respect of working hours	Work sites near human settlements	Unannounced visits after working hours Review and records generated through the Grievance and Redress Mechanism	No noise-generating works ongoing beyond working hours No complaints from local residents	During construction works	GSE
Work site accidents and casualties due to construction works	System of protecting workers' health and safety	Entire length of TLs GSE's Human Resource Department	Visual inspection Checking workers' personal files	Personal protective gear issued to construction workers and used by them. Employees operating heavy machinery and working on stringing/testing trained for this tasks. Health and life insurance provided to workers. First aid medical kits kept at work sites at all times and contact information for the closest health clinic readily available.		

Activity / Impact	What (Is the parameter to be monitored?)	Where (Is the parameter to be monitored?)	How (Is the parameter to be monitored?)		When (Define the frequency / or continuous?)	Who (Is responsible for monitoring?)
			Method	Indicator		
OPERATION PHASE						
Visual appearance of the TL corridor deterioration due to abandoned basements of removed towers	Dismantling of replaced towers	Tower locations	Visual inspection	No basements of old towers remaining unremoved from the corridor	Shortly after completion of rehabilitation works	GSE internal control
Vegetation control under the TLs	No use of pesticides by regional branch of GSE operating TLs	Entire length of TLs	Check of procurement files; Visual inspection	No documents on the procurement of pesticides found on file; No visual evidence of pesticide use on-site	Regularly during maintenance	GSE internal control
Maintenance works	Movement of vehicles and machinery confined to service roads	Maintenance works sites	Visual inspection	No traces of tires and damaged vegetation observed in the vicinity of maintenance work sites	Regularly during maintenance	GSE internal control
New residential settlement	Public health and safety maintained along the TLs' corridor	Entire length of TLs	Visual inspection; Inspection of issued construction permits	No formal or informal new residential constructions appear in proximity to the TLs where human exposure to electric and magnetic fields may be exceeding safety threshold	Regularly during operation of TLs	GSE State law-enforcement bodies

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