SFG3832

KYRGYZ REPUBLIC

COMMUNITY DEVELOPMENT AND INVESTMENT AGENCY

Community Support Project CASA-1000 (P163592)

ENVIRONMENTAL AND SOCIAL MANAGEMENT FRAMEWORK (DOCUMENT)

BISHKEK

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List of abbreviations and acronyms

ARIS	Community Development and Investment Agency (ARIS)
AA	Aiyl Aymak
WB	World Bank
BoQ	Bill of Quantities
W	Watt
CO	Carbon monoxide
CASEREM	South Asia Regional Energy Market
CASA-1000	
km	Kilometer
EA	Environmental assessment
ESMP	Environment and Social Management Plan.
EIA	Environmental Impact Assessment
ESMFD	Environmental and social management framework document
PAP	Project Affected Persons
RPF	Resettlement Policy Framework
GRM	Grievance Redress Mechanism.
CSP	Community Support Project
KR	Kyrgyz Republic
IDA	International Development Association
NOx	Nitrogen and nitrogen dioxide
OM	Operational Manual
$PM_{2.5}$	Particulate matter, 2.5 micrometers or less
PIU	Project Implementation Unit
RAP	Resettlement Action Plan
NETK	National Energy Network of Kyrgyzstan
a/c	agricultural
IT	Internet
ES	Engineering staff
FS	Feasibility study
SAEPF	State Agency for Environmental Protection and Forestry
SES	Sanitary - epidemiological supervision
NPO	Non-profit organization
DDE	Detailed Design and Estimates
TS	Transformer substation
FL	Fuels and lubricants
LSG	Local self-government
PIU	Project Implementation Unit
RG KR	Resolution of the Government of the Kyrgyz Republic
MIA	Ministry of Internal Affairs

1. Purpose and Context

This Framework Document on Environmental and Social Management for Safety Measures is considered part of the Community Support Project Operational Manual. The objective of this Manual is to ensure environmental sustainability throughout the implementation cycle of sub-projects, and to provide ARIS ES and consultants with technical manual and procedures for:
(i) determining the potential environmental and social impacts of subprojects implemented under the CSP;
(ii) development of environmental mitigation plans and their inclusion in the bill of quantity (BoQ) of tender documents for sub-projects to minimize the environmental impact;
(iii) identifying monitoring requirements that guarantee the implementation of measures to mitigate and minimize environmental impacts.

Community support project under CASA-1000 project (hereinafter referred to as the "Project") in the Kyrgyz Republic (KR) aims to improve the livelihood development, empowerment and infrastructure services (including energy supply) in order to increase socio-economic opportunities, inclusion and stability in communities around the CASA-1000 power transmission line.

The project will benefit the target communities living along the 450-kilometer CASA-1000 power transmission line in the Kyrgyz Republic. The route of the 450-kilometer CASA-1000 transmission line through the Kyrgyz Republic is currently defined as a corridor 2 km wide, passing through three oblasts (Jalalabad, Osh and Batken) and 19 (populated) AAs. Corridor of impact is defined as a corridor 3 km wide, centered on the final power line route. At present, there are about 30 villages with a population of 100,000 people in the corridor of impact, and about 115 villages with a population of about 300,000 within the AAs, crossed by a power line.

Project implementation will have a positive impact and will be beneficial for the targeted villages: (i) improvement of rural energy supply, support for social infrastructure, support for livelihoods (Component 1), (ii) community mobilization and capacity building, civil society engagement and awareness raising , provides for the development of a multimedia communication strategy, taking into account the level of education, access to the Internet (Components 2), (iii) Project management and coordination, monitoring and project evaluation (Component 3).

It is believed that low voltage problems (usually 170 W instead of 220 W, according to reports) are the result of excessive load on the system at the local level, although in some cases the voltage limit may also exist at higher network levels, especially in the winter months when demand for electricity - the maximum. The proposed Project will have a positive social impact on a wide range of stakeholders and beneficiaries, which will directly benefit from improving the quality of the electricity provided and improving the social infrastructure in targeted villages (lighting, water supply, social facilities, etc.).

Environmental issues. It is expected that the Project will cause certain short-term adverse effects on atmospheric air, soil, water and noise levels, especially during construction. The following environmental problems are most likely to be related to the activities of Component 1: noise, soil and water impacts from construction work, restriction of vehicles movement during construction and rehabilitation works, construction dust and debris, and safety of workers and local residents related to electric shock, as well as the effects of transformer oil associated with the spills during the dismantling or installation of transformers. However, these negative impacts will be temporary and depend on the construction site, and they can be smoothly mitigated by implementing appropriate prevention and / or mitigation measures. Negative impacts on the natural environment, protected areas, historical and cultural heritage sites are not expected, since the project will be implemented in settlements.

Social issues. Negative social impacts are minimal. For a long time, a distrust has been rooted among the

population that any reforms will improve the quality of service, and the allocated resources will be used for the intended purpose. Social tensions in the country (associated with regional and ethnic divisions), coupled with a lack of transparency and accountability in the sector, and inaccessible information on priority government investments in the sector, may be a certain risk to the project. These risks will be mitigated by clear, transparent and socially inclusive selection of beneficiaries, extensive information campaigns and civil society engagement to increase transparency and accountability of the sector, build relationships with clients and engage local communities.

Taking into account the requirements of the World Bank's Operational Policy 4.01 "Environmental Assessment" regarding the type, location, sensitivity and scale of the project, nature and extent of potential negative environmental impact, all sub-projects will belong to Category B. Since the key priority objects will be determined on the basis of decision-making at the community level. They are likely to include water supply and sanitation facilities, first aid stations, kindergartens, rehabilitation of roads and improvement of pasture infrastructure, as well as other facilities - additional improvement of energy supply in rural areas. Once the exact location and investment placing within CSP is known, the Environmental and Social Management Plans (ESMPs) and the Resettlement Action Plans (RAPs) will be developed if necessary.

ARIS is responsible for documenting the work on environmental and social monitoring by filling out forms of supervision at the facilities, storing them, and preparing regular reports describing the monitoring results. These reports summarize the findings of the work done at the community level, analyze the general problems identified, explain the nature of the corrective measures developed to solve the problems, and assess the status of the corrective measures taken, taking into account the recommendations proposed in the previous reporting period. This reporting will cover not only environmental and social safeguard policies, but also broader environmental and social issues (for example, gender issues, consideration and satisfaction of complaints, etc.).

ARIS will prepare reports on the status of compliance with environmental social requirements before World Bank missions to assist in the implementation of the Project, or more often, if necessary. Analytical data on compliance with safeguards policies will be included in the annual progress reports on CSP implementation. The reports will be supplemented with photo documentation. Checklists for on-site monitoring and reports will be stored in electronic and paper forms in ARIS, and provided to the World Bank upon request.

Access to information and public consultations

ARIS will be responsible for the publication of documentation on environmental and social issues developed for the purposes of CSP. This documentation includes this ESMFD, as well as those developed for individual sub-projects of ESMP and RAP. Consultations with stakeholders of the project, especially with the local community, which will be directly affected by the Project, are a mandatory requirement by development of ESMP and RAP. Public comments will be taken into account in the drafts of these documents before they are finalized. This ESMFD will be posted in Russian and English on the ARIS website and other relevant media, and will be discussed with all stakeholders of CSP.

The consultation process for each sub-project will be carried out before the works start on the sub-project site. The consultation process involves disclosing information-providing information about a sub-project to affected communities and providing access to such information by other interested parties. This information will be presented in a clear language, and will also be accessible and understandable for various groups of people in the community. The information can be posted in every house, building of local authorities, in public libraries, published in local print media, sounded on the radio or during public meetings. The timing and manner of disclosure may vary depending on the particular needs of the affected communities, but the information should be disclosed as early as possible.

2. Project Background

Hydro resources are the most important natural wealth of Kyrgyzstan, and the prospects for economic development and the country's place in the global economic system directly depend on their effective use. At the same time, experience in hydro resources development proves the need for solving problems in development of Kyrgyzstan, and for creating conditions, and for social progress.

Despite the fact that the level of electrification (rate of the grid connection) is, generally, high (the average figure for the country is about 95%), reliability and quality of service provision are very low, that is, its quality (low voltage) and reliability are worsened by a combination of a number of factors - aging infrastructure, overloads, high distribution losses, inefficient use as a result of low tariffs and insufficient generation / generation capacity (during the winter months).

Access to uninterrupted and efficient electricity supply is crucial for the well-being of the population and the provision of public services in the Kyrgyz Republic. Exports of net excess summer energy at a relatively low cost would help the Kyrgyz Republic receive income, needed to strengthen the budget to finance fuel resources to meet electricity needs in the winter, and to promote energy efficiency programs, thus allowing for more efficient management with energy crises due to shortage of electricity in winter periods on medium and long term basis. In 2006, the Central Asian countries (Kyrgyz Republic and Tajikistan) and the South Asian countries (Afghanistan and Pakistan) signed a memorandum of understanding defining the basis for the regional energy market - the Central Asian and South Asian Regional Energy Market (CASAREM) - for the distribution of surplus energy resources Central Asia to meet electricity needs in South Asia. The first stage of CASAREM is to provide the necessary power transmission systems and trading infrastructure systems for the sale of about 1,300 megawatts (MW) of electricity from Central Asia to South Asia. In May 2016 in Dushanbe, the leaders of these four countries officially announced the launch of the CASA 1000 Project.

To mitigate the security risks of a project aimed at exporting electricity from the Kyrgyz Republic to South Asia in order to strengthen the ownership of communities living along the power line and at the same time use the opportunity to develop these communities (including access to uninterrupted year-round electricity supply) from the side of Kyrgyzstan, 450 km of the AC transmission line will be used in this CASA1000 Project, that will extend from the Datka Substation (Jalalabad Oblast) to border, with an additional 25 kilometers on the Tajik side, reaching the Khujand Substation. The line will follow the borders of Uzbekistan and Tajikistan, passing through regions that are economically weak and isolated, prone to regular ethnic tensions and heated exchanges between Kyrgyz and Uzbek border guards (Jalal-Abad, Osh and Batken). The total cost of CASA-1000 Project is currently estimated at US$ 1.7 billion. The Kyrgyz share will be financed by a World Bank grant directly to the NEGK in charge of the Kyrgyz portion of the project

To date, the alignment of the 450 km CASA-1000 transmission line through the Kyrgyz Republic is currently defined as a 3 km-wide corridor, traversing three oblasts (Jalal-Abad, Osh and Batken) and 19 (inhabited) Aiyl AImaks (AAs). The corridor of impact is defined as a 3 km-wide corridor centered on the final route of the transmission line. It is currently estimated that there are about 30 villages within the corridor of impact, and about 115 villages within the AAs that are crossed by the transmission line. To mitigate the safeguard risks of a project aimed at exporting electricity from the Kyrgyz Republic to South Asia in order to strengthen the ownership of communities, living along the power line, and at the same time use the opportunity to develop these communities (including access to uninterrupted year-round electricity supply).

3. Project description

3.1 Project activities description

The goal of the project is to support the improvement of livelihood development, empowerment and infrastructure services (including energy supply) to improve socio-economic opportunities, inclusion and stability in communities in the CASA-1000 power transmission line area.

The project will adopt a "1+3" structure. The "1" refers to the first year, which will lead with investments specifically in local-level electricity infrastructure, and energy-related awareness building. The "3" refers to the remaining three years in which broad-based community-driven development (CDD) activities will be implemented. The first year will not only create the link to the CASA-1000, but also address the risk of community disquiet that electricity is being exported by the transmission line while many communities experience significant problems with the quality of household electricity supply. The first year will not only create the link to the CASA-1000, but also address the risk of community disquiet that electricity is being exported by the transmission line while many communities experience significant problems with the quality of household electricity supply.

The project includes 3 components: (1) Support for community-driven investments in social and economic infrastructure, (2) Support for community mobilization, capacity building, civil participation and communication, (3) project management, coordination, monitoring and evaluation.

Component 1: Support for community-driven investments in social and economic infrastructure (village investment grants)
The component will include investments in rural energy infrastructure and related energy awareness building. a) Improved energy supply in target villages. In subsequent years, the social and economic infrastructure / facilities will be more widely supported, based on the decision-making process on community-based priorities. b) Supporting social infrastructure in target villages, including water supply and sanitation facilities, first aid points, kindergartens, rehabilitation of roads, pasture infrastructure, and other facilities additionally approved by the community to partially improve the energy supply of villages. And facilities, c) aimed at supporting livelihoods in selected AAs.

Sub-component 1A: Support for electricity improvements within target villages (1st year).
Activities under this subcomponent will be aimed at improving electricity supply (transformer substations, power lines, street lighting, etc.), searching for alternative energy sources, and conducting campaigns to raise awareness of energy-efficient technologies in communities in the vicinity of the transmission line. Within the subcomponent, the following activities will take place:

- Informing communities about the NETK research results, about the state of the rural power system;
- Prioritization of energy supply problems at the village level;
- Sub-grants for village power supply

Sub-component 1B: Support for social infrastructure and services in target villages.
Within the subcomponent, the "traditional component of community based development" will be implemented, where the community selects priority investments at the village level with active involvement of local communities.

Support for three rounds of community investment for small infrastructure development (for 30 communities annually) as support for building expansion and renovation, construction of new facilities (access to adequate electricity and energy saving, kindergartens, schools, street lighting, roads, improvement of pasture infrastructure, medical centers, youth centers and sports facilities). The total investment will be approximately US$ 4 million for all target villages, within three years starting in the second investment year. The distribution coefficient of grants for villages and the share of the community contribution will be further specified

Sub-component 1C: Support for livelihood facilities in selected AAs
Within the framework of this subcomponent, support will be provided for construction of livelihood facilities at the AA level (such as greenhouses, craft workshops, agricultural processing facilities or IT centers, etc.) that facilitate the development of entrepreneurship.

The sub-grant will be the equivalent of US$ 1.4 million in the project. Presumably, construction of livelihood facilities is expected. The distribution coefficient of grants for villages and the share of the community contribution will be further specified

Component 2: Support for community mobilization, youth engagement and communications
This component will finance all social mobilization processes, communication campaign and information dissemination activities aimed at relevant stakeholders in aiyl aimaks and, possibly, rayons /oblasts along power transmission lines. It is planned to develop a multimedia communication strategy, taking into account the level of education, access to Internet, etc.

This component will target both local communities and local governments (local administrations and local Keneshes). Within the framework of the innovative process involving young men and women as leaders of community-led processes, community-based lessons of social cohesion will be adapted.

- ***Sub-component 2A: Community mobilization and capacity building***
- ***Sub-component 2B: Support for youth engagement, awareness building and social accountability***
- ***Sub-component 2C: Communications***

Component 3: Project management, and monitoring and evaluation
This component will finance the additional costs of the executive agency related to project management, incl. coordination and supervision of the implementation of activities, financial management, annual audit, as well as monitoring and evaluation. Responsibilities for the management and coordination of project activities will be assigned to a team of project management specialists formed within the executing agency.

The project will coordinate the activities of construction, design and other organizations in the course of the project implementation, manage regional ARIS offices in oblasts. Within the framework of the Project component, there will be coordination between aiyl okmotus and the involved parties in the project implementation. Project management will be based on the ARIS information system.

Sub-component 3A: Project Management and Coordination
Sub-component 3B: Monitoring and evaluation.

The expected amount of the Japanese Social Development Fund (JSDF) (2.80 million US dollars + $ 0.2 million US - supervision by the Bank)

Component 1: Preparing young people for the labor market

- **Sub-component 1A:** Preparing youth for the labor market
- **Sub-component 1 B:** Support for innovative / electronic services

Component 2: Creating market opportunities for young people

- **Sub-component 2 A:** Support the creation of value added in value chains
- **Sub-component 2 B:** Support for the development of companies using electronic technologies and the potential of enterprises

Component 3: Project management and administration, M & E and dissemination of knowledge

- **Sub-component 3 A:** Project management
- **Sub-component 3 B:** Monitoring and evaluation

4. Legal and Institutional Framework

4.1 National legislative and regulatory framework

The major regulatory legal acts regulating the issues of environmental protection, labor and safety in the Kyrgyz Republic ("KR") are given below. Other legislative and by-laws applicable to the project are given in Annex 6.

The Kyrgyz Republic Constitution (2010) - is the basis of the entire legislative base. The Constitution provides for the right of all citizens to an environment that is friendly and healthy, and to compensate for harm caused to health or property by actions in the field of nature management.

The Law of the Kyrgyz Republic "On Environmental Protection"[1] is the basis for comprehensive regulation of public relations in the sphere of interaction between society and nature. The law establishes basic principles of environmental protection and defines measures to ensure environmental protection in terms of rationing environmental quality, defining specially protected natural areas, establishing rules and procedures for the management of natural resources, implementing a system for monitoring and supervising the environment, and strengthening response procedures on emergency situations. The law prohibits the financing and implementation of projects related to the use of nature, without the positive conclusion of the state environmental expertize.

The Law of the Kyrgyz Republic "On Environmental Expertise"[2] ensures compliance of economic and other activities with environmental requirements. The law applies to projects that may have an impact on the environment, including a feasibility study and design documentation for the construction, reconstruction, expansion, technical re-equipment, as well as to other projects that can exert such influence, regardless of their estimated cost, departmental subordination and ownership.

The law obliges the project initiator to submit the necessary documents related to the project and its environmental impact to conduct the state environmental expertise. The Expert Commission of the State Agency for Environmental Protection and Forestry is responsible for reviewing the submitted documents.

To finance or implement the project, a positive conclusion of the state environmental expertise is required. A negative conclusion will lead to a ban on the project implementation.

There are two types of environmental expertise in the Kyrgyz Republic: state and public (the conclusion of public environmental expertise is advisory in nature).

The Law of the Kyrgyz Republic "General Technical Regulations for Ensuring Environmental Safety in the Kyrgyz Republic"[3] establishes general requirements for ensuring environmental safety in the design and implementation of economic and other activities for production, storage, transportation and disposal of products.

The law establishes the types of economic activity subject to environmental expertise and their hazard categories (I, II and III), which are determined depending on the amount of pollution of the natural environment, the amount and species composition of harmful substances released into the atmosphere, discharged to the terrain or water objects, as well as placed waste (Appendix 1), types of economic activity

[1] Dated June 16, 1999 No. 53 (with amendments and addendums of February 4, 2002 No. 22, June 11, 2003 No. 101, August 11, 2004 No. 113, August 6, 2005 No. 124, April 27, 2009 No. 131).

[2] Dated June 16, 1999 No. 54 (with amendments and addendums of February 11, 2002 No. 22, June 11, 2003 No. 102, August 26, 2007 No. 21, August 4, 2005 No. 124, April 27, 2015 No. 21).

[3] Dated May 8, 2009 № 151 (with the amendments and addendums dated March 1, 2012 № 11).

subject to mandatory environmental expertise). The hazard category is determined by the state authorized body on the basis of information provided by the entity of economic and other activities.

The Regulation on the procedure for environmental impact assessment in the Kyrgyz Republic (2015) establishes the procedure for assessing the impact of the expected activity on the environment. Environmental impact assessment ("EIA") consists of the following stages: (1) decision on EIA, (2) preliminary EIA (based on project feasibility study) (3) EIA (on the basis of project documentation - project, working draft) and (4) post-project analysis (conducted in one year after the activity starts). For facilities with a low level of environmental impact specified in the Regulation, only the statement of environmental consequences is filled.

The Law of the Kyrgyz Republic "On Production and Consumption Waste" (2001) regulates relations arising in the process of the formation, collection, storage, use, neutralization, transportation and disposal of production and consumption wastes; public administration, supervision and control in the field of waste management, prevention of negative impact of production and consumption wastes on the environment and human health when handling them, as well as their maximum involvement in economic circulation as an additional source of raw materials.

In accordance with the law, the activities of legal entities and individuals associated with the handling of waste are subject to licensing in accordance with the Law of the Kyrgyz Republic "On Licensing".

The Law of the Kyrgyz Republic "On Protection of Atmospheric Air" (1999-2016) defines the basic principles of the Kyrgyz Republic aimed at ensuring the purity of air and improving its quality, preventing and mitigating chemical, physical, biological and other influences on air quality. According to the law, the contractor undertakes to carry out demolition or construction activities, as well as transportation and temporary storage of waste, minimizing dust and other emissions into the air.

The Law of the Kyrgyz Republic "On Labor Protection"[4] establishes the legal basis for regulating relations in the field of labor protection between employees and employers and is aimed at creating working conditions that meet the requirements of safety, occupational health and the working environment.

The Law of the Kyrgyz Republic "On Industrial Safety of Production Facilities"[5] defines the legal, economic and social bases for ensuring the safe operation of hazardous production facilities and is aimed at preventing accidents at hazardous production facilities and ensuring the readiness of legal entities operating hazardous facilities to localize and eliminate the consequences of these accidents.

Law of the Kyrgyz Republic "Technical Regulations" On Industrial Safety "(2013) defines the major provisions of technical regulation in the field of industrial safety, aimed at preventing accidents at hazardous production facilities and ensuring organizations' readiness to localize their consequences.

The Law of the Kyrgyz Republic "On Fire Safety" (2016) is aimed at protecting the life and health of citizens, property of individuals and legal entities, state and municipal property from fires, determines the major provisions of technical regulation in the field of fire safety and establishes general fire safety requirements for products, objects of protection, including buildings and structures, production facilities, fire-technical products and general-purpose products.

[4] Dated August 1, 2003, No. 167 (amended and supplemented on April 17, 2009, No. 127, dated October 31, 2014 No. 149).

[5] Dated November 19, 2001, No. 93 (amended and supplemented on April 30, 2009, No. 145).

4.2 Institutional framework for environmental assessment and management, labor protection and fire safety

A number of state agencies are responsible for the management and protection of the environment in the Kyrgyz Republic, as well as labor protection, safety engineering (Table 4). The leading agency is the State Agency for Environmental Protection and Forestry, whose powers are to ensure compliance with the requirements of legislation in the field of environmental protection.

Table 4.1: The main government agencies that perform functions to ensure the environment, labor and safety protection.

Authority	Relevant functions
State Agency for Environmental Protection and Forestry under the Government of the Kyrgyz Republic (SAEPF)	1) defines the state policy in the field of environmental protection; 2) establishes quality standards and standards for environmental protection; 3) defines specially protected natural territories; 4) establishes a system for monitoring environmental pollution; 5) conducts an environmental review of project documents and business activities.
Environmental Monitoring Department	Conducts monitoring of the state of atmospheric air, soil, water
State Environmental and Technical Inspection under the Government of the Kyrgyz Republic	Carries out the state supervision and the control over performance of requirements of ecological and technical safety Carries out state supervision and control over compliance with the requirements of labor protection, fire safety
Ministry of Health (MoH) Department of Sanitary and Epidemiological Surveillance (SES)	Conducts bacteriological and chemical monitoring of drinking water quality, monitors electromagnetic emissions, noise levels, vibration
Agency for Hydrometeorology under the Ministry of Emergency Situations of the Kyrgyz Republic (Kyrgyzhydromet)	Conducts monitoring of the state of atmospheric air, soil, water
Kyrgyz State Design Institute for Land Management under the State Registration Service of the Kyrgyz Republic (Kyrgyzgiprozem)	Carries out a number of activities on land management and land cadaster throughout the territory of the Kyrgyz Republic, regardless of the organizational and legal form of land users

4.3 World Bank safeguard policies

According to the World Bank's safeguard policies, Environmental Assessment (EA) is a process that precedes the project implementation stage, during which the potential environmental risks of the project and its impact are assessed; the project alternatives are being studied; identify ways to improve the selection, location, planning, design and implementation of the project by preventing, minimizing, mitigating or compensating for damage caused by negative environmental impacts and by improving the positive impact.

EA includes processes for mitigating and managing negative environmental impacts during the implementation of the project. Conducting an EO is mandatory for projects that may have a potentially negative impact. Moreover, at all stages of the process, it is obligatory to hold public consultations. If the project activities to be financed cannot be determined at the project development stage, the Bank applies the Environmental and Social Management Framework Document (ESMFD), which provides detailed information on the procedure, criteria and responsibility for the preliminary environmental assessment (screening) of sub-projects, preparation, implementation and monitoring of the project's environmental and social assessments.

There is a principle of 10 + 1 environmental and social protective measures of the World Bank aimed avoiding, minimizing and mitigating the potentially negative environmental and social impacts of projects financed by the World Bank. The World Bank safeguard policies relating to the project and their applicability to the project are given in Table 4.2 below.

Table 4.2: World Bank's safeguard policies and their applicability to the project

Safeguard policies	Applicability
Environmental assessment (OP / BP 4.01)	This OP applies if the project can have a negative environmental and social impact associated with soil degradation, water and air pollution, occupational safety and health issues, and so on. It is also believed that such potential impacts will be mostly temporary, applicable only to the project sites. In order to prevent such impact, the client has prepared the ESMFD, which defines the rules and procedures for the EA on subprojects, and establishes eligibility criteria for the selection of effective technologies
Involuntary Resettlement (OP / BP 4.12)	This OP is applicable, since activities for component 1., in particular, construction / reconstruction may lead to economic and physical resettlement
Disclosure Policy (BP 17.50)	The ESMFD and the RFD will be made public, and will also be the subject of public discussions in the country. These documents will also be disclosed in the World Bank Infoshop prior to the project evaluation. All safety data sheets prepared in the future will also follow the principle of distribution of the Bank's information.

The Bank conducts an environmental study of each proposed project in order to determine the acceptable degree and type of EA. The bank classifies the proposed project into one of three categories, depending on the type, location, vulnerability and scale of the project, and the nature and magnitude of potential environmental impacts.

Category A (Not funded under CSP). For sub-projects of this category, a complete EA is needed, because the types of environmental impact can be extremely diverse, and the impacts are significant.

Category B. For sub-projects of this category, it may be sufficient to carry out the EA in a narrower framework (since the types of impact can be quite specific), or develop of an environmental management plan (EMP) and possibly a monitoring plan (MP) for environmental measures. Any EA report of Category B project proposed for financing by the World Bank will be disclosed to affected groups of individuals and NGOs. Such disclosure is a mandatory prerequisites for the World Bank to evaluate such projects.

Category C. As a rule, there is no particular need for EA, since there are no environmental impacts from the project activities

Sub-project selection

The proposed project belongs to Category B and its potential adverse impacts on people and environment are not going to be significant.
When implementing sub-projects, it may be necessary to:
- conduct a simplified environmental impact assessment;
- develop and environmental management plan;
The Kyrgyz legislation provides a list of projects for which a "Full Environmental Impact Assessment" is required (Annex 2).

Subprojects (Categories A) are not eligible and are not funded under the CSP because the types of environmental impacts can be extremely diverse, and the impacts are very serious and may have a significant adverse impact on the environment. Such an impact can cover a territory larger than the sites or facilities on which work is supposed to be carried out.

When receiving sub-project proposals from LSGB, ARIS reconciles with the list of projects under Annex 2 and Annex 2.1 and rejects the sub-projects listed in this list. ARIS will also be guided by the principles of risk assessment in the final decision on the project. I.e., even if there is no such activity in the list, ARIS can consider that it is too risky for financing. Thus, upon the end of selection, only those sub-projects that require a brief environmental impact assessment or develop a mitigation plan are received for consideration (Annex 1).
When selecting subprojects, the initiators of the activity - LSGs, if necessary with the help of ARIS specialists, fill in the forms of environmental selection. (Annex 7)

The expected environmental impacts of subprojects that will be implemented under the CSP will not be substantial and irreversible. They can be prevented, minimized or mitigated by taking appropriate preventive measures, and will also be envisaged in the development of DDE or a technical solution. This means that potential negative impacts will be excluded or reduced to acceptable levels.

The impact on resettlement in the form of temporary acquisition of land plots, restriction of access to livelihoods, is expected for Component 1 in connection with civil works to improve, replace, or reconstruct part of transmission networks, build / reconstruct schools, kindergartens, provide water supply, improve pasture infrastructure and etc. Since priority activities will be defined at the community level, the scope of civil works is not known before the decision-making process. As a consequence, the RPF is prepared and disclosed before the assessment. RPF defines the principle of resettlement process under the project. RPF guide the preparation, update, implementation, and monitoring of the project RAPs. It also establishes requirements for eligibility and the right to receive reimbursement. Once the project structure has been finalized and the types of work and its location are known, the borrower will prepare a Resettlement Action Plan (RAP) that meets the requirements of the RPF and is subject to approval by the World Bank, discussion with the affected persons and disclosure. The implementation of RAP should be fully met by the World Bank prior to civil works. No civil works can be started before impacted persons have been compensated through means spelled out in the Resettlement Action Plan.

4.4 Applicable national legislation and World Bank requirements for environmental assessment

Although the basic rules and procedures for environmental assessment provided for in national legislation are somewhat similar to those of the World Bank, there is a difference, which mainly relates to the categories of preliminary environmental assessment (screening). The national legislation defines the types of economic activity that are subject to mandatory environmental expertise. The procedure for conducting environmental assessment in accordance with national legislation (i.e. EIA) consists of the following stages: (1) decision on EIA, (2) preliminary EIA (based on project feasibility study) (3) EIA (on the basis of project documentation - project, working draft) and (4) post-project analysis (conducted in one year after the

activity starts). For facilities with a low level of environmental impact specified in the Regulation, only the statement of environmental consequences (ECS) is filled.

In the Kyrgyz Republic, two types of environmental expertise can be conducted, state and public. At the same time, the conclusion of the latter is of a recommendatory nature.

4.5 Applicable national legislation requirements and World Bank requirements for involuntary resettlement

RPF includes comparison of national legislation requirements and World Bank requirements for involuntary resettlement. The RPF defines the guidelines for resettlement. In the event of a discrepancy between national legislation and the World Bank's policy, the provisions of the World Bank prevail.

4.6 Social safeguards

4.6.1. General Provisions

A Guidance Document on development of appropriate measures to mitigate and provide compensation for land allotment and impact on social sector, caused by the planned work of subprojects, whose sites have not yet been defined, will be the Basics of the Resettlement Planning Framework (RPF), which will be developed on the basis of OP 4.12 "Involuntary resettlement" and agreed with the World Bank.

RPF will serve as the basis for development of activities that involve land allocation, restriction of access to land or services, and loss of property. Through RPF, possible impacts from project implementation will be identified, indicating the extent of the possible impact (temporary or permanent) on land use / access to land or facilities, and the amounts and procedures for providing compensation and resettlement assistance will be determined.

4.6.2. Preparation of documents on the RPF. ARIS is responsible for preparation of the RFP documentation. For each specific sub-project, if necessary, specific Resettlement Action Plans (RAPs) will be developed, based on the recommendations and procedures presented in the RFP document.

4.6.3. Development of the RAP

The RAP will be drafted in consultation with persons affected by the project (PAP), based on the RFP procedures. The prepared RAPs are disclosed on the ARIS website. Then they are sent to the local self-government bodies and interested parties for comments. After the comments and no-objection of CSP management, the RAP is sent to the WB for approval in accordance with the RFP procedures and only then it is subject to implementation.

4.6.4. Assessment of assets subject to impact

Methods for assessing assets that are affected by the project will be applied in accordance with RFP.

4.6.5. Grievance Redness Mechanism

If, in the process of preparing the RAP, the PAP has problems related to the resettlement process, for example, regarding the valuation of assets, etc., he / she has the right to appeal with an oral complaint to the ARIS representative and / or submit a written complaint to ARIS. The general complaint process will be developed in the RFP.

4.6.6. RFP implementation budget

The RAP will draw up a project budget for resettlement, which will be financed through rules and guidelines on administration and financial management, like any other event eligible for payment under the Project. Responsibility for compensations and other types of assistance is vested on LSG

4.6.7. Monitoring and evaluation

The monitoring mechanisms will correspond to the overall monitoring plan for the entire project, which will be implemented by ARIS. All RAPs will include goals, with the help of which they can be evaluated for their success. In order to assess whether these objectives are met, the RAP will specify the parameters to be monitored, the monitoring steps are established, and the resources necessary for monitoring are provided, as well as the measures for handling complaints. Monitoring and evaluation mechanisms will be given in each RAP.

4.7.8. Reporting

ARIS should annually provide the World Bank with general information on funded sub-projects, their environmental impact in order to assess and prevent any cumulative effects of similar investments. ARIS will provide the WB mission on project supervision all the results of environmental assessments and plans for managing the impact on the environment, prepared in the framework of funded sub-projects.

5. Potential environmental impacts and mitigation measures under the Project

5.1 Environmental benefits

The project will generally have positive environmental and social impacts on the proposed project areas.

Expected benefits of investment include: (i) reduction of energy losses through the installation of upgraded transformer substations, lighting installation, power lines, (ii) improving the reliability and quality of electricity supply through priority measures aimed at the most vulnerable areas, (iii) improving vallage infrastructure, water supply, reconstruction / construction of schools, kindergartens, (iv) installation of efficient environmentally friendly heating stoves is possible.

5.2. Potential negative environmental and social impacts

It is expected that the Project will cause certain short-term adverse effects on atmospheric air, soil, water and noise levels, especially during construction. The following environmental problems are most likely to be related to the activities of Component 1: noise, soil and water impacts from construction work, restriction of vehicles movement during construction and rehabilitation works, construction dust and debris, and safety of workers. However, these negative impacts will be temporary and depend on the construction site, and they can be smoothly mitigated by implementing appropriate prevention and / or mitigation measures. Negative impacts on the natural environment, protected areas, historical and cultural heritage sites are not expected, since the project will be implemented in settlements.

As a result of the implementation of Component 1, the main potential negative environmental impacts during the implementation of the Project will be as follows:

Water pollution. With the leakage of fuels and lubricants (fuel and lubricants) from construction machinery and stored waste, petroleum products and chemicals can pollute the soil, penetrate into groundwater or drain into surface water bodies. Maintenance and cleaning of construction machinery and mechanisms near natural streams can lead to water pollution. If temporary settlements of builders are formed on a construction site, pollution of the environment can be caused by sanitary facilities in settlements.

Impacts on Biodiversity. During construction, the necessary earthwork for construction can damage the vegetation cover and lead to cutting down of green plantations. Careers for building materials, disposal of excess material and waste can disturb the animal world, including affecting the natural habitat. However, since all works will be performed mainly on the developed territory, significant damage is unlikely, as well as impacts on cultural heritage sites or natural habitats.

Noise, vibration and temporary air pollution. Dust will be generated as a result of construction work, transportation of construction materials / waste and traffic of freight vehicles. Strong increase of noise level is expected during construction, material transportation, construction equipment operation, in particular during excavation, pneumatic drilling, work of construction cranes. Noise and vibration will cause concern to local residents if the work is carried out in the vicinity of residential areas.

Seismic zone. According to the Institute of Seismology of the National Academy of Sciences of the Kyrgyz Republic, the city of Bishkek is located in the seismic activity zone with a magnitude of 8 and above (8, 9 and >9). When designing and building foundations, potential seismic factors should be carefully studied.

Formation of recovered material and construction debris. The following types of garbage will be formed during the construction of Component 1: (i) construction debris, transportation, handling, compressor works, jackhammers and other construction equipment, soil surpluses and stones, cut trees, bushes, household waste, obsolete equipment and materials, and; (ii) hazardous waste - construction debris containing asbestos plaster, asbestos slate, mineral wool and ruberoid, worn tires, filters and oils from construction equipment and transformer substations.

Dangerous production factors as a result of civil works. Direct impact on safety and health of people in civil works can be caused by various factors, for example, high-altitude work, the work of cranes and bulldozers, welding, and sanitary conditions, electric shock, etc. The potential impact on the safety and health of workers is also associated with occupational injuries during construction (falling structures, etc.) or contaminated drinking water or food.

Electric shock.
Electric current injury. Electric current injury may result from contact with electric chain with voltage and/or current sources able to induce electric flow through a part of the body that came into a contact with electric current. Usually the sensitive current flow for a human is more than 1 mA. Besides, when working with high voltage installations an electric shock may result without contacting a current-conducting elements, but due to leak of current or air gap breakage with electric arc generation.

Due to high electric resistance of human tissues they are heated rather fast which may cause injuries. Even a relatively low voltage, around 110 – 230 V, upon short-time contact with chest may cause a disruption to cardiac muscle work (60 mA for alternate current, 300 – 500 mA for permanent current). An electric shock may cause a nervous system disorder, for example, random muscle contraction. Repeated electric shocks may cause a neuropathy. Acute electric injury may be reason of growing asystole.

In case of head electric injury loss of consciousness is potential. Under a enough high voltage and current strength the so called arcing may appear, inflicting serious burns (injuries).

During the construction works and operation of equipment, activities will be carried out ensuring a secure manufacturing job. When operating the electric installations, personal protective equipment will be used. In the course of works, the sites will be fenced and taped off. The access to the site of work for unauthorized persons will be prohibited. Only workers who completed trainings on working with electric equipment and safety techniques when operating electric installations will be allowed to the site of work.

Road traffic. Any effort will be made to minimize the time spent on construction vehicles and trucks on the roads, in order to prevent any incidents or damage to property. Drivers will be warned that they should move with caution. Speed restriction in work areas and road traffic with heavy machinery will also be regulated. The proper organization of traffic will also prevent a negative impact on traffic, as far as possible.

Historical and cultural heritage sites Provisions regulating actions in case of accidental finds are included in this ESMF.

Transboundary impacts. The proposed project will not cause any transboundary impacts.

Social impacts. Minimal negative social impacts during the construction phase are expected, and they will be limited by concern facilities of social significance. Performed works can also restrict or block people's access to homes, land plots or other private or public property. Local residents may not be notified in advance of forthcoming work and temporary break in providing municipal or communication services due to road works. It is likely that affected persons will be concerned because of inappropriate behavior of contractors, or by monitoring the negative impacts of ongoing work, while they will not know how to voice their concerns and express their proposals.

It is assumed that, according to the procedures for Component 1, workers from local residents will be hired for non-qualified jobs.

5.2 Proposed mitigation measures

All work should be performed only after obtaining the necessary permits and approvals.

Organizational measures. Prior to the commencement of construction work, it is necessary to inform local inspectorates for construction supervision and environmental protection and the public of forthcoming activities through media and (or) on sites open for general access (including at work sites) through the disclosure of ESMP and RAP (if necessary) for a specific site for each sub-project. All activities required to implement protective measures for environmental protection and monitoring should be planned and provided for in the budget of the Customer's work plans, contractors and subcontractors. All works should be carried out in a safe and disciplined manner, with minimal impact on population and environment.

Safety and health of people during civil works. Construction workers should wear protective helmets, protective glasses, safety belts and protective shoes. Prior to commencement of civil works, workers must be instructed on safety rules. In addition, it is necessary to constantly check machinery and equipment for the purpose of identifying and repairing malfunctions, to observe periods of equipment repair, to conduct training and instructing workers who carry out maintenance of mechanical equipment, tools and devices, and safe methods and tools of work. It is forbidden to: supply with faulty or unproven tools for operation, and also leave unattended mechanical tools connected to electrical network or compressed air hoses; pull and twist cables and air hoses; Cables and hoses must not intersect with wire ropes, electrical cables; One should not hold the rotating elements of mechanized tools. It is necessary to strictly observe the current national regulations on the safe operation of cranes / earthmoving machinery and welding operations. The principal requirements in this regard are indicated in the proposed measures to mitigate the impacts of the ESMFD.

Combating air pollution and minimizing dust. During construction activities, it is necessary to store demolition wastes in the controlled area, sprayed with water to reduce dust generation. During operation of the pneumatic equipment / destruction of walls, the dust generation should be suppressed by constantly spraying water and / or installing anti-dust barrier screens on the site. No open burning of construction / waste materials at the site. Reduction of work on loading / unloading of bulk materials. When transporting any dust-forming materials to the site of restoration work, goods must be sprayed or covered. The formation of dust in the construction site during the dry season can be minimized by watering the land.

Reducing the impact on the soil and vegetation layer. Construction workers should work in such a way as to minimize the “environmental footprint" on the site. The movement of vehicles and construction equipment is allowed only along the designated access roads to prevent damage to grass cover and other vegetation cover along the site. If cutting trees is necessary within the right-of-way to provide space or to ensure the operation of construction equipment, strict control measures should be taken to prevent cutting down excessive trees and causing damage to other trees growing near. If cutting trees and bushes is unavoidable, damage must be compensated by planting trees / bushes in places coordinated with local authorities.

Prevent pollution of soil and water. Maintenance and refueling of construction machinery and equipment must be performed in service centers located at the maximum possible distance from the site. In case of performing these works on the site, it is necessary to provide an impenetrable surface for fueling and to have a stock of absorbing substances if an emergency spill occurs. Washing of machines should be prohibited near surface water bodies. Do not store building materials, if possible. Otherwise, the building material should be stored on the construction site, and protected from atmospheric effects. Used automobile oil, supplies of combustive-lubricating materials and other dangerous substances should be stored also on an impermeable surface, preferably under a canopy, and should be protected from fire. If

residential buildings for workers are located in construction camps, septic tanks or toilets with a pit should be provided, and during their operation, direct discharge of water into surface water bodies and deterioration of sanitary conditions should not be permitted.

Prevention of soil erosion. Earthwork can be conducted for a long time along the object and in quarries. Soil compaction, improvement and restoration of excavated areas should be carried out immediately after completion of work in selected sites of the affected area, rather than postpone such work until the work is completed. Sawing or planting of vegetation should be undertaken as necessary to prevent erosion. The soil and vegetation layer should be removed from the sites and stored separately during excavation so that it can then be used to restore the site and restore natural vegetation as much as possible. The use of existing quarries should be encouraged to prevent a massive environmental footprint of work.

Collection and recycling of waste. Waste should be minimized, separated and handled appropriately, if possible. The burning in the open air and the illegal dumping of any waste is strictly prohibited.

Non-hazardous waste - demolition waste and others, as well as wastes containing asbestos, will be disposed at specially designated landfills in consultation with local authorities. Excess of the excavated soil will be returned to the officially designated sites. The construction contractor will receive a permit to export the waste.

Maintenance of construction equipment and machines will be carried out in specialized service centers, which also accept worn tires, filters and waste oil.

Containers for waste disposal will be placed to collect household waste from the construction site and the construction base (if available). The issue of regular removal of household waste will be coordinated with local authorities.

Utilization of transformer oil. Among many other wastes to be disposed, the waste of transformer oils should be specially noted. Although utilization of transformer oil is an economically viable procedure, enterprises are trying to minimize the amount of waste oil, which is achieved through special separation, filtration and recovery technologies to extend the shelf life of the oils. Contaminated transformer oils must be disposed and replaced with new oils, as they do not correspond to the technical requirements applied to them. Waste oil is a serious danger to the environment, therefore utilization of transformer oil is a necessary stage in completion of the oil operation. Unutilized waste oil can be a source of water pollution, which will affect the quality of water and the entire local ecosystem as a whole. It is worth mentioning the danger of ignition of oils, which will lead to release into the atmosphere of hazardous substances for human and animal life, which also indicates the need for utilization of transformer oil. The main methods used for the utilization of transformer oil are processing, incineration and regeneration. Among them, the most beneficial is the method of regeneration. Regeneration is a step-by-step cleaning of transformer oil: removal of mechanical impurities and water, evaporation, adsorbent purification. As a result, a base oil is obtained, identical to fresh, and its yield is 80-90%. Various methods of cleaning are high-tech processes, but often this is cheaper than processing and burning old oil and purchasing a new one. Spent transformer oils are a valuable raw material resource, as they are not only waste that must be destroyed, but also a product that is recyclable. Secondary use becomes possible after the processing of oils in order to remove impurities and contaminants from them through a variety of technological operations. Thus, the utilization of transformer oil is economically advantageous in view of the fact that when it is recycled for re-use it takes several times less energy and raw material costs than for the primary production of oil from oil products. Utilization of transformer oil is carried out by the "National electric network of Kyrgyzstan", transformer oil in part in the case of detection of PCBs, purification and partial utilization are carried out.

Within the project implementation, the transformer substations containing PCB may be replaced. Short summary on possible impact of PCB to human health and environment and its visual identification methods are provided in Application 8.

Handling with asbestos, ruberoid and mineral wool. The general approach in dealing with these materials is that construction companies should not allow the fragmentation (or) destruction of waste; to ensure their disposal in a closed area in order to prevent their unauthorized removal by any persons. In addition, construction companies should also not allow the release of asbestos fibers into the air as a result of crushing. Workers should wear special clothes, gloves and respirators when working with asbestos plasters, ruberoid and mineral wool. The use of asbestos-containing materials is not allowed in selected sub-projects.

Work near the historical and cultural heritage sites (HCH), the procedure for finding in case of accidental finds of cultural value. Works in vicinity of HCH sites are coordinated with local authorities. In the event of "accidental find" is found during excavation, the contractor must immediately stop all physical work at the site and inform the local authorities, prior to receiving written notice with permission to resume work.

Solving the issue of causing concern to local communities. Local communities should be notified of the timing and scope of the planned work. If work is carried out near or in close proximity to residential areas, then working hours should be strictly limited to daylight and the site should be sprayed with water to prevent dust formation. Special signs and, possibly, fencing, passages should be used if the work is carried out near children's institutions. Speed limit of traffic in residential areas should be observed. Temporary storage of construction materials and garbage, as well as parking of construction equipment, should not block or restrict access of local residents to their property and public places or, if unavoidable, alternative temporary routes should be organized.

Safety of traffic and pedestrians. Storage sites for waste and materials, work camps and access roads should be clearly marked. Work should be planned and undertaken in such a way as to minimize traffic disturbance and risk to local residents. The personnel operating the building machinery and heavy vehicles must have the appropriate licenses and be trained.

Resettlement issues: The World Bank's Operational Policy 4.12 “Involuntary resettlement" provides protective policies for addressing and mitigating the risks of impoverishment associated with involuntary resettlement under the development projects. The main objectives of OP 4.12 are that involuntary resettlement should be prevented, if possible. At least, socio-economic impact should be minimized and affected persons should be able to obtain benefits from the project. Consultations should be conducted with the affected persons and they should be able to participate in planning and implementation of the resettlement program. Resettled persons should be assisted in their efforts to improve conditions and improve living standards, or at least to restore them to the pre-project level.

To address the negative impacts of involuntary resettlement, the World Bank policy requires that affected persons:

(a) were informed of their opportunities and rights in connection with resettlement;
(b) participated in consultations and had the opportunity to choose various feasible options for resettlement;
(c) without delay received full compensation for losses associated with the loss of property;
(d) receive assistance, for example, travel allowance when changing their place of residence;
(e) In addition to compensation, they received development assistance, for example, in the form of access to credit and training programs, employment opportunities;
(f) vulnerable persons among resettled persons, for example, people with disabilities, the elderly, women, widows and children should receive targeted social assistance.

All activities on these issues will be carried out in full accordance with the terms of HSIP Resettlement Planning Framework (RFP), including in the preparation of the Resettlement Action Plans (RAPs), if necessary.

5.3 Scope and objectives of ESMP

ESMP is considered an obligatory document, which must be observed during the project implementation.

ESMP consists of a set of mitigation, monitoring and institutional responsibility measures that will be taken during the implementation and operation of facilities to eliminate negative environmental and social impacts, compensate them, or reduce them to an acceptable level. The Environmental and Social Management Plan (see Annex 1) describes measures to mitigate the specific impacts resulting from the construction, renovation of buildings or structures, including occupational safety and health, earthwork, collection and disposal of solid and hazardous waste.

ARIS will be responsible for monitoring the compliance of all activities financed under the Project with the Bank's environmental protection measures in the environmental and social spheres relevant to the Project, as well as with the requirements of the Kyrgyz national legislation. Environmental monitoring of the work will be carried out according to the PUOS described in this document. Environmental and social monitoring involves regular inspection of sites, of all physical activities under the Project, financed by the contractors of the project, and monitoring the implementation of ESMP and RAP, if necessary. A form for supervising construction works or reconstruction and modernization works was developed. This form will have practical value in carrying out environmental and social monitoring (Annex 3).
Contractors and beneficiaries of the Project are obliged to comply with the Project ESMP (and the RAP, if necessary). The civil work contractor should have special personnel responsible for implementing the ESMP during the construction phase. ARIS will monitor the implementation of mitigation measures and adherence to good practices as prescribed by these documents and, if deficiencies are identified, notify contractors / beneficiaries of the sub-project of identified problems and require corrective action. In case of non-elimination of violations and a serious violation of RAP/ESMP requirements, ARIS will impose envisaged sanctions for violation of terms of the contract. ESMP will be included in the bidding documents for execution of work, and the RAP, if necessary, will be attached to the work contracts, and thus the contractors will be required to comply with the requirements of this documentation. The Contractor will receive a copy of the RAP after its preparation and will become acquainted with the expected impact on resettlement and will ensure a minimum degree of this type of impact. In cases where the RAP requires repair or restoration of the property of project affected population (PAP), these measures can be included in the contract with the construction organization.

Since the Project within Component 1 also includes standard small-scale measures for restoration of public buildings (schools, kindergartens, etc.), it is proposed to use the standard format of the ESMP Checklist (the “ESMP Check List") prepared by the World Bank to provide "pragmatic good practice" and developed for each of the sub-projects to be implemented to ensure compliance and compatibility with the requirements of safeguard provisions (see the template in Annex 2). The document considers standard approaches to warning, preventing and mitigating impacts when implementing contracts for construction, dismantling or installation with local impact. This document should be drawn up (adjusted) with the help of environmental impact data prepared at the first stage of the sub-project ESA.

ANNEX 1: Environmental and Social Management Plan (Component 1)

Sub-project, its location and brief characteristics

Ecological and social components	Impacts	Proposed mitigation measures	Institutional responsibility for minimizing of impacts	Cost of mitigation measures
Construction period				
Physical environment				
Soil				
Water resources				
Air quality				
Biological environment				
Fauna and flora				
Social environment				
Aesthetics and landscape				
Community				
Cultural heritage				
Safety, health of personnel and population				
		Operation period		
		Physical environment		
soil				
Water resources				
Air quality				
		Biological environment		
Fauna and flora				
		Social environment		
Aesthetics and landscape				
Community				
Cultural heritage				

ENVIRONMENTAL MONITORING PLAN

Activity / Action	**Which** parameter is subject to monitoring?	**Where** will the parameter be monitored?	**How** will the parameter be monitored?	**When** (determine the frequency / or on an ongoing basis)	**For what** is the parameter monitored?	**Who** is responsible for monitoring?
Stage of construction						
Operation stage						

Annex 2

Activities subject to mandatory EIA in the Kyrgyz Republic

1. Energy facilities:
1) combined heat and power plants, thermal power plants, hydroelectric power stations;
2) industrial plants for the production of electricity, steam, hot water;
3) lines of pipelines supplying gas, oil and oil products, heat;
4) high-voltage power lines;
5) warehouses of oil and oil products, gas, solid fuel;
6) ash-and-slag-pits.
2. Reservoirs.
3. Enterprises for extraction and processing of oil, oil products, gas.
4. Manufacture of building materials (cement, asphalt, slate, asbestos-cement pipes and others).
5. Agriculture and Forestry:
1) projects of intensification of agriculture;
2) projects for the organization and reorganization of rural landholdings;
3) water management projects for agricultural purposes;
4) land reclamation projects with a view to changing the type of land use;
5) poultry, livestock, fish breeding complexes;
6) land reclamation projects.
6. Mining industry:
1) exploratory and experimental operation;
2) extraction of mineral raw materials (marble, basalt, salt, sand, gravel, clay and others);
3) coal mining;
4) mining of ores;
5) ore processing;
6) production of non-ferrous, rare, precious metals;
7) utilization and disposal of waste, including hazardous and toxic.
7. Metal industry:
1) machine-building industry;
2) production of semiconductor materials;
3) enterprises repairing aviation and railway transport;
4) production of radio and television equipment;
5) foundry and metal rolling production.
8. Manufacture of glass.
9. Manufacture of pharmaceutical, biological, protein preparations.
10. Chemical production.
11. Food industry:
1) production of fats and oils;
2) production of meat and dairy products;
3) production of sugar;
4) production of tobacco;
5) production of wine and vodka products;
6) Alcohol production:
7) production of beer;

8) production of canned food.
12. Textile, leather, paper industry:
1) primary processing of wool and hides;
2) production of chipboards, cardboard, wood-fiber boards;
3) leather production;
4) production of paper;
5) dyeing;
6) rubber technical production.
13. Warehouses of toxic, dangerous, radioactive substances.
14. Facilities for wastewater treatment, flue gases.
15. Underground water intakes.
16. Water supply systems for populated areas, irrigation and drainage systems.
17. Construction of roads and railways.
18. Airports, aerodromes, testing grounds, ports of inland navigation, motor racing tracks.
19. Construction of recreational and tourist facilities.
20. Organization of industrial units.
21. Sewerage networks.
22. Mountain lifts and cable cars.
23. Recycling, processing and disposal of industrial and domestic waste.
24. Gas stations.
25. Stations of maintenance and pre-sale preparation of vehicles.

Activities not subject to EIA in the Kyrgyz Republic

The usual renovation of the building.

Internal construction work.

Small construction inside the master plan, previously subjected to an EIA.

Research and development that do not pose a threat and danger to the environment.

Acquisitions that do not require actions that adversely affect the environment.

Construction of houses, socio-cultural and communication facilities that are not threatened (for example, connection to central heating systems, water supply and sewerage systems)

Annex 2.1

Examples of projects,
acceptable to WB financing

Category "B" - average potential impact.

A plan for environmental management may be required.
Gardening, agriculture, livestock, processing of agricultural products, food industry
Agricultural diversification and high-value specialization (flowers, herbs, fruits, honey, improved varieties of seeds).
Livestock (cattle-breeding, processing of meat of animals and poultry, slaughterhouses).
Processing of fruits and vegetables, conservation.
Manufacture of wines and other beverages.
Purchase of agricultural consumables and agricultural machinery.
Small forest plots.

Small industrial production, trade, retail trade, provision of services
Craft workshops (carpentry, blacksmithing, plumbing, electricity, repairs).
Creation and updating of retail stores.
Creating grocery stores and providing personal services.
Warehouses and storage facilities.

Renovation and rehabilitation of community infrastructure
Renovation / repair of public buildings (schools, clinics, libraries, public institutions for recreation).
Rural roads (repair and renovation).
Small irrigation systems (repair and restoration).
Renewal of utilities (for example, power lines, water supply, sewage system, waste disposal)
Small bridges (with spans <25m)

Category "C" - Low potential impact
Marketing and commercial services.
Professional services:

1. current repair;
2. work on internal renovation of buildings;
3. small-scale construction, which is carried out with the previously evaluated master plan;
4. inventory and plans for monitoring the environment;
5. Research and development that does not cause any environmental consequences or hazards;
6. Procurement, which does not require from the agency actions that negatively influence on the environment;
7. the construction of residential buildings, social and cultural life, which by their engineering communications do not have a harmful impact on the environment (connected to centralized sources of heat, water supply, sewerage networks).

Examples of projects not acceptable to WB financing

Storage of explosive and hazardous substances.
Production or sale of hazardous substances containing, for example, carcinogenic, mutagenic or teratogenic properties, including creosote and chlorinated solvents.
Maintenance and repair of chlorine / fluorocarbon devices (CFCs).
Storage and packaging of pesticides and herbicides.
Extraction of commercial minerals and sand mining (except for mining in a small volume of sand, stones, gravel).

Projects that do not conform to the fundamental principles of WB policy

Manufacture and processing of tobacco products.
Production, distribution or sale of illegal pesticides.
Sale of natural products from the list of CITES.
Any activity involving significant use of radioactive materials.
The use or production of chlorine / fluorocarbons (CFCs).
Production of products containing polychlorinated biphenyl (PCBs).

ANNEX 3: Template for **ESMP checklist for subprojects (Component 1)**

The ESMP checklist consists of the following sections:

Part 1 is a narrative, which indicates the project details, organizational and legislative aspects; project description, the need for a capacity building program, and description of the public consultation process. The description should indicate the social significance of the building, the number of people using or benefiting from modernization of the building, and covered gender aspects, as necessary. This section should consist of approximately two pages. Applications with additional information can be added, if necessary.

Part 2 includes checklist for screening potential environmental and social impacts in a simplified form "YES / NO". If the yes response triggers an activity or problem, a reference is made to the relevant section in the table in Part C, which describes activities for environmental and social management and mitigation measures.

Part 3 is an environmental monitoring plan that should be followed for the proper implementation of the initiated measures in Part B. This part is drafted in the same format as proposed in the standard requirements for safeguards for Category B projects.

Part 4 contains a simple monitoring plan that will help the Contractor and authorities, as well as World Bank specialists, to monitor the proper implementation of environmental management and protective actions, and to identify in a timely manner deviations and shortcomings.

Parts 2 and 3 have been designed in such a way as to provide concrete and enforceable environmental and social measures that are understandable to non-professionals (e.g., for contractor facility managers) and that are easy to verify and implement. ESMP should be included in the Bill of Quantities and the terms of sale for bidders. The structure of Part 4 is also structured in such a way as to make it easier for non-specialists in this field to monitor key parameters using simple means.

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PART 1: GENERAL INFORMATION ON THE PROJECT AND FACILITY

PART 1: GENERAL INFORMATION ON THE PROJECT AND FACILITY. INSTITUTIONAL AND ADMINISTRATIVE ASPECTS				
Country				
Project name				
Scope of the project and activities				
Organizational arrangements (Name and contact details)	WB Task Team Leader	Project management	Local party and / or recipient	
Implementation activities (Name and contact details)	Supervision of compliance with safeguards policies	Supervision by a local counterparty	Supervision by the local inspection	Contractor
FACILITY DESCRIPTION				
Name of the facility				
Description of facility location			Annex 1: Site map [] Yes [] No Annex 2: Waste management agreement / permit Annex 3: The building permit (if required)	
Who is the Land owner?				
Who will benefit from the project (for example, students, teachers, hospitalized population, etc.)?				
Description of geographical, physical, biological, geological, hydrographic and socio-economic conditions				
Location and distance from the source of supply of materials, especially fillers, water and stones				
LEGISLATION				
Specify national and local regulatory documents, and required permits for the execution of project work				
PUBLIC CONSULTATIONS				
Specify when and where there was a consultation with the public				
INSTITUTIONAL CAPACITY BUILDING				
Is capacity building envisaged?	[ ] No or [x] Yes. If "Yes", Annex 4 contains a capacity building program			
Was there a local source of labor?	[] No or [] yes If No, provide a brief explanation			

PART 2: SCREENING OF SAFEGUARD POLICIES AND Situations triggering procedures

PRELIMINARY ASSESSMENT OF ENVIRONMENTAL / SOCIAL IMPACT for situations that trigger procedures			
	Activity / Question	**condition**	**Startup Actions**
Will the following types of work be carried out at the site?	X. Does the activity of the project fall into Category A, as specified in OP 4.01, paragraph 8 (a)	[ ] Yes [ ] No	If the answer is "yes", the project does not meet the requirements
	A. Building restoration	[ ] Yes [ ] No	If the answer is "yes," see Section **A** below
	B. Construction of new small-scale structures or infrastructure	[ ] Yes [ ] No	If the answer is "yes," see Section **A** below
	C. Impact on the sewage disposal system from the facility	[ ] Yes [ ] No	If the answer is "yes," see Section **B** below
	D. Historic building (s) and areas	[ ] Yes [ ] No	If the answer is "yes," see Section **C** below
	E. Acquisition of land plot[6]	[ ] Yes [ ] No	If the answer is "yes," see Section **D** below
	F. Harmful or toxic materials[7]	[ ] Yes [ ] No	If the answer is "yes," see Section **E** below
	G. Impact on forests and/or protected areas	[ ] Yes [ ] No	If the answer is "yes", see Section **F** below
	H. Risk of unexploded ordnance	[ ] Yes [ ] No	If the answer is "yes," see Section **G** below
	I. Safety of traffic and pedestrians	[ ] Yes [ ] No	If the answer is "yes," see Section **H** below

[6] The acquisition of a land site involves the resettlement of local residents; change in their sources of existence or income, intrusion into privately owned land, that is, land plots that are acquired or transferred for the project, and affects people who live and / or spontaneously settle and (or) carry out commercial activities on the acquired land (for example, keep kiosks).

[7] Toxic / hazardous materials include, but are not limited to, asbestos, toxic paints, toxic solvents, residues of lead-based paints, and the like.

PART 3: MITIGATION MEASURES

ACTIVITY	PARAMETERS	CHECKLIST OF MITIGATION MEASURES
0. General conditions	Information and security on site	(a) Local construction and environmental inspectorates, as well as local residents, were notified of upcoming work. (b) The public was informed of the work through proper communications in the media and (or) through posting of advertisements in public places (including site). (c) All permissions for construction or restoration work required by law have been obtained. (d) The Contractor formally agrees that all work will be carried out in a disciplined and safe manner and will be organized so as to minimize the impact on local people and the natural environment. (e) Individual means of worker protection will comply with the norms of international best practice (the continuous use of protective helmets and, if necessary, protective masks and glasses, safety belts and safety shoes). (f) On the site will be placed pointers, informing workers about the basic rules and norms that should be observed.
A. General restoration and / or construction activities	Air quality	(a) In digging, dust control measures will be applied, for example, spraying and moistening the soil. (b) Waste demolition, excavated soil and fillers will be stored in a specially designated area, and will also be moistened to prevent dust formation. (c) In the case of pneumatic drilling or a break in the pavement and bases, the dust will be absorbed by the constant spraying of water and / or installation of dust collection screens. (d) Preventing soil and construction debris from entering surrounding areas (sidewalks, roads) to avoid the spread of dust. (e) Preventing the burning of outdoor building materials / waste in the work area. (f) The construction equipment must comply with the Kyrgyz Republic regulations on emissions; proper operation and maintenance will be ensured, and there will be no excessive accumulation of unused construction equipment in the work site.
	Noise	(a) Construction noise is allowed only at the set time in accordance with the permission received for the work. (b) During the work, the engine shrouds of generators, air compressors and other power mechanical equipment must be closed, and equipment should be placed as far as possible from residential areas.
	Water quality	(a) Appropriate erosion and sediment management measures will be taken at the site, for example, using bales of hay and / or by installing barriers preventing the sediment moving away from the site and increasing the turbidity of nearby streams and rivers.
	Collection and recycling of waste.	(a) For all major types of construction waste generated during digging, demolition and construction work, collection points and removal routes will be established. (b) Mineral waste from construction and dismantling will be separated from simple debris, organic, liquid and chemical wastes by sorting on site and storage in proper containers. (c) Collection and removal of construction waste will be carried out by specialized licensed enterprises.

ACTIVITY	PARAMETERS	CHECKLIST OF MITIGATION MEASURES
		(d) To confirm the proper collection and disposal in accordance with the project, garbage collection will be recorded. (e) In all cases, if possible, the contractor shall ensure the recycling of relevant applicable and resistant materials (excluding ACM).
B. Impact on the sewage disposal system from the facility	Water quality	(a) Uncontrolled diversion of groundwater, discharge of waste water, cement slurry or any contaminated water into underground or adjacent streams or rivers is not permitted; the contractor will receive the necessary licenses and permits for collection of water and controlled discharge to public sewage systems. (b) The required storm drainage systems shall be installed and siltation, contamination, blockage or other adverse effects on natural streams, spe- cies, ponds, and lakes as a result of construction work shall not be allowed. (c) Procedures should be developed to prevent and respond to emergency fuel, fuels and lubricants, and other toxic or poisonous substances. (d) Washing of construction equipment and equipment will be carried out exclusively in designated areas, the water flow from which will not contaminate natural sources of water.
C. Historical Buildings	Cultural heritage	(a) If construction work is carried out in the vicinity of a historic building or in a historic area, it is necessary to notify and obtain approvals / permits from local authorities, and all construction activities must be carried out in accordance with local and national legislation. (a) Provide for measures, if artifacts or other "accidental finds" are found during the execution of earthwork or construction work, the fact of detection to be recorded, officials are notified, and work on the site was suspended or changed taking into account such findings.
D. Acquisition of land plot	Plan / scheme of land acquisition	(a) If land extraction was not foreseen, but required, or if loss of sources of income for legitimate or illegal land users was not anticipated, but can occur, then it is necessary to consult the Head of the Bank Project Team. (b) An approved land acquisition plan / scheme will be implemented (if required by the project).
E. Toxic materials	Collection and recycling of waste.	(a) If there is asbestos on the project site, it should be clearly labeled as a hazardous material. (b) If possible, asbestos will be placed in appropriate sealed containers to minimize its impact. (c) Before removing asbestos (if removal is necessary), it will be treated with a moisturizing compound to reduce the formation of asbestos dust. (d) Qualified and experienced specialists will be allowed to work with asbestos. (e) If there is a need for temporary storage of asbestos-containing materials, all wastes must be placed in secure closed containers, provided with appropriate marking. Security measures will be taken against unauthorized removal from the site. (f) Removed asbestos can not be reused.
	Collection and disposal of toxic / hazardous materials	(a) In case of on-site temporary storage of hazardous or toxic substances, such substances will be placed in reliable containers, on which the composition and properties must be indicated, as well as information on handling of such substances. (b) Containers with hazardous substances should be placed in hermetically sealed containers to avoid leaks and

ACTIVITY	PARAMETERS	CHECKLIST OF MITIGATION MEASURES
		leaching. (c) Transportation of waste will be carried out by specialized licensed carriers with disposal at established facilities. (d) Paints with toxic components or solvents or paints on a lead basis will not be used.
F. Impact on forests and/or protected areas	Protecting the ecosystem	(a) No damage will be caused to recognized natural habitats and protected areas located in the immediate vicinity of the site, and such territories will not be used; All personnel will be prohibited from hunting animals, extracting feed, cutting down trees or causing other harm. (b) It is necessary to conduct a survey and inventory of large trees near the construction site; it is necessary to put indexes, build a fence, protect the root system and prevent any damage to the trees. (c) Adjacent wetlands and streams will be protected from runoff from the site by appropriate measures to combat erosion and sediment, for example, by using bales of hay and / or installing barriers. (d) It is not allowed to use adjacent territories, especially protected areas, for reserve excavations, temporary quarries and waste dumps.
G. Risk of unexploded ordnance	Threat to safety and health of people	(a) Prior to commencement of any excavation work, the Contractor shall confirm that the construction site was checked for the presence of unexploded ordnance by competent authorities and cleared of them in the event of detection.
H. Traffic and pedestrians safety	Direct or indirect security threat of traffic and pedestrians safety in connection with conducting of construction works	(a) In accordance with national legislation, the Contractor guarantees proper protection of the construction site and traffic control related to construction. This includes the following measures, among others: ▪ Placement of signs, warning signs, barriers and bypass signs: the site should be clearly visible and the public should be aware of all potential hazards ▪ The system of traffic management and training of employees, especially in terms of entry to the site and intensive traffic near the city. Arrangement of safe passageways and passages for passengers in places where traffic is obstructed. ▪ Correction of working hours taking into account the local traffic load, for example, avoidance of serious transportation activities during peak hours and during intensive movement of livestock movement. ▪ Active participation in regulation of traffic by trained employees in clearly visible clothing on the construction site to ensure safe and convenient passage of population. ▪ Providing safe and permanent access to office premises, shops and residences during construction work.

PART 3: MONITORING PLAN							
Stage / project activities	**Which** parameter is subject to monitoring?	**Where** will the parameter be monitored?	**How** will the parameter be monitored?	**When** (determine the frequency / or on an ongoing basis?)	**For what** is the parameter monitored?	**Cost** (if not included in the project budget)	**Who** is responsible for monitoring?
During the project implementation							
Health and safety of workers	- Construction workers use special clothing and personal protective equipment; - Strict adherence to the rules of operation of construction equipment and the use of personal protective equipment; - Strict compliance with the laws and regulations of the Kyrgyz Republic governing construction work; - Availability of basic fire-fighting tools and means; - Availability of records on training and safety instructions	Construction works area.	Visual observation and analysis of submitted documentation	In the course of construction and in accordance with state regulations relating to provision of labor safety	Reduce the likelihood of injuries and accidents for builders	The PIU costs, as part of the project costs	PIU
Provision of building materials (e.g. paints / solvents)	Purchase of building materials from registered suppliers	In office or warehouse of the supplier	Verification of labels on materials and / or certificates, if any	During the conclusion of contracts	Ensure the reliability of building materials and their safety for human health	The PIU costs, as part of the project costs	PIU
Transportation of construction materials and garbage	- Technical condition of vehicles and equipment; - Protection of goods in the vehicle with the help of special upholstery;	- Construction site; - Routs for transportation of	Checking the quality of roads adjacent to the construction	Sample checks during business hours	- Limit contamination of soil and air with exhaust gases;	PIU costs, as part of the project costs	PIU

Moving of construction machinery	- Compliance with the established time and transportation routes	construction materials and garbage	site, in traffic direction according to the route		- Limit the inconvenience to the local population caused by noise and vibration; - Minimize stop of traffic		Patrol Police Main Directorate of the Kyrgyz Republic Ministry of Internal Affairs
Maintenance of construction machinery and equipment	- Washing machines and construction equipment outside the construction site or at the maximum distance from natural watercourses; - Refueling or lubrication of construction machines outside the construction site or at a predetermined isolated area	Construction site.	Verification of works	Sample checks during business hours	- Do not allow contamination of water and soil with oil products as a result of machinery/equipment operation; - Timely localize the fire and reduce the possible damage	PIU costs, as part of the project costs	PIU
Formation of non-hazardous construction debris	- Temporary storage of construction debris in specially designated places; - Timely removal of garbage in officially authorized places	Construction site; Garbage dump	Verification of works and analysis of supporting documents for garbage collection and its transportation	Periodically, during construction and after its completion	- Prevent pollution of soil, surface and groundwater; - Do not allow accidents at the construction site due to scattered fragments of building	PIU costs, as part of the project costs There are no specific additional costs: it is included in the general duties of the municipality	PIU Municipality

					materials and construction debris; - Save the aesthetic appearance of the construction site and the surrounding area		
Garbage formation as a result of dismantling of worn out equipment	- Temporary storage of dismantled equipment or metal structures in specially designated areas; - Transportation of dismantled equipment or metal structures to a metal processing plant.	Construction site / installation site Processing enterprise	Verification of works	Periodically, during the construction / installation and after its completion	- Prevent pollution of soil, surface and groundwater; - Do not allow accidents at the construction site due to scattered fragments of building materials and construction debris; - Save the aesthetic appearance of the construction site and the surrounding area	PIU costs, as part of the project costs	PIU
Formation of	- Removal of roofing sheets	Construction	Verification of	Periodically, during	- Prevention of	PIU costs, as part	PIU

construction debris containing asbestos as a result of the roof replacement	containing asbestos, with a minimum crushing to prevent the formation of dust; - Spraying water of roofing sheets during removal to minimize dust formation; - Temporary storage of dismantled roofing sheets in covered form in a specially designated place; - Timely removal of roofing sheets in closed cargo transport to a special place for disposal; - Backfill by a layer of soil the garbage, containing asbestos at the final disposal site; - The use of special clothing and personal protective equipment (glasses and respirators) by workers and employees responsible for working with garbage containing asbestos at each stage	site; Garbage dump	works Verification of works and analysis of supporting documents for garbage collection and its transportation	construction and after its completion	harm to the health of construction workers and other people who can get to the construction site; - Preventing harm to the health of workers recycling garbage, and other people who can get to the place of waste disposal	of the project costs There are no specific additional costs: it is included in the general duties of the municipality	Municipality
Formation of toxic waste due to replacement of mercury lamps	- Strict separation of used mercury lamps and other types of debris accumulated in public buildings; - Preparation of toxic waste for temporary storage by placing in containers and full marking (details of the	- Territory of public buildings; - Processing enterprise	Visual inspection	Periodically, during the storage and processing of toxic waste	Prevent pollution of soil and water.	PIU costs, as part of the project costs	PIU State Inspection of Environmental and Technical Safety

	composition, substances and information on disposal); - Recycling and disposal by a contractor who has a license for waste disposal						
Public works (construction / installation / reconstruction)	The parameters are prescribed in the permit for construction - all special construction conditions imposed by various bodies	Design Documentation Permit for construction	Part of the regular checks conducted by PIU	During the construction / installation and prior to the issuance of a permit for operation	Regular inspections are prescribed in the permit for construction to ensure compliance with environmental requirements in accordance with the laws and regulations of the Kyrgyz Republic and the ESMP	Included in the costs of contractors	Civil work Manager PIU
	Air quality and noise	Construction site	Visually	During the construction phase	Do not allow pollution of the environment and impact on the health of workers	Included in the costs of contractors	Civil work Manager PIU
	Wastewater	Construction site	Visually	During the construction phase	Do not allow pollution of the environment and impact on the health of workers	Included in the costs of contractors	Civil work Manager PIU
Planning and restoration work at the	Final cleaning of the construction site and permanent access roads, as	Construction site.	Verification of works	Final construction phase	To reduce the loss of the landscape	Included in the costs of contractors	Civil work Manager

construction site	well as the necessary landscape design and landscaping of the territory				aesthetic value as a result of construction works		PIU
During operation							
Operation and maintenance	Regular maintenance of facilities	Territory of public buildings;	Site inspection	The whole period of operation	Maintenance of the facility in safe and working condition	Should be included in the budget for operation and maintenance of boiler houses	Administration of public buildings
Combustion of solid fuel in replaced furnaces	Exhaust of nitrogen oxides, carbon monoxide into the atmosphere	In the boiler room smoke pipe	Instrumental methods	Annually.	Reduce greenhouse gas exhausts	Should be included in the budget for operation and maintenance of boiler houses	Administration of public buildings Head of Technical Control
Readiness of the renovated boiler-houses for emergencies	Availability of firefighting equipment in accordance with the regulatory requirements of the Kyrgyz Republic	Territory of public building	Periodic checks	The whole period of the facility operation	- Reduce risks for workers and visitors - Do not allow disruptions in work and inconvenience to workers and visitors	Should be included in the budget for operation and maintenance of boiler houses	Administration of public buildings State Inspection of Environmental and Technical Safety

ANNEX 4: Checklist of issues on environmental monitoring while supervision of construction works

Facility Location					
Contractor					
Supervisor					
Date of the facility inspection					
Condition of construction works					
Documents and activities for verification	Status				Notes:
	Yes	Partially	No	No data	
The contractor is licensed to extract natural resources					
The contractor received a permit to operate the concrete mixing / asphalt mixing device					
Contractor concluded an agreement on collection and utilization of waste					
The contractor concluded an agreement with service provider for removal of household waste from the facility					
Work site is fenced and warning signs are installed					
Work does not impede pedestrian access and traffic, or temporary alternative access roads are organized					
Working hours are observed					
Construction equipment and machinery are in a standard technical condition (there are no excess exhausts or noise, fuel leaks)					
Building materials and waste are covered with a special coating during transportation					
The construction site is sprayed with water when performing work that generates large amounts of dust					
Temporary settlement of workers or the contractor's base are fenced; sites for temporary storage of waste and maintenance of vehicles / equipment are allocated.					
Water is delivered to the workers' camp and sanitary conditions are provided					
The temporary settlement of workers or the contractor's base is equipped with first aid and firefighting facilities					
Workers wear a special uniform and protective means that are acceptable for the work performed (gloves, helmets, respirators, glasses, etc.).					
Maintenance and fueling of construction machinery and equipment are carried out in a specially designated area on which there is an impenetrable surface, in case of an accidental spill.					
Washing machines and construction equipment is done outside the construction site or at the maximum distance from natural watercourses;					

Construction debris is removed only to specially designated places.					
Extraction of natural building materials is carried out in compliance with conditions specified in the license.					
The surplus material and the upper soil-vegetation layer obtained as a result of excavation are stored separately and used to fill / restore the site as required.					
The works are temporarily stopped in case of "accidental finds" and the state agencies, responsible for preservation of cultural heritage sites, are notified of the fact of detection.					
After the completion of the physical work at the site, the camp / base of the contractor is cleaned of any remaining elements after the work and planning and restoration work is carried out.					

ANNEX 5: Other legislative and by-laws

Law of the Kyrgyz Republic "On the rate of payment for pollution of the environment (exhausts, discharges of pollutants, waste disposal" (2002) sets the rate for a pollution charge in a certain amount to a ton of pollutants.

Law of the Kyrgyz Republic "On Water"[8] regulates relations in the sphere of use and protection of water resources (water), prevention of environmentally harmful impacts of economic and other activities on water bodies and water facilities and improving their condition and strengthening the law in the field of water relations. The law regulates the quantity and quality of water discharged into nature, prohibits the release of industrial, domestic and other wastes and sewage into water bodies.

Law of the Kyrgyz Republic "On Licensing" (1997-2011). According to this law, a license is required for the following activities: (1) processing, disposal and destruction of toxic materials and substances, including radioactive materials; (2) transportation (including across the border) of toxic industrial waste.

Atmospheric air quality criteria are given in Table 6.1.

Table 6.1: Atmospheric air quality criteria (mg/m3)

substance	Maximum permissible concentration	The average daily concentration	Hazard Class
Total suspended particles	0.15	0.05	3
Sulfur dioxide (SO2)	0.5	0.05	3
Carbon monoxide (CO)	5	3	4
Nitrogen dioxide (NO2)	0.085	0.04	2
Nitric oxide (NO)	0.40	0.06	3
Tetraethyl lead	0.0001	0.00004	1
Source: hygienic norms of HN "Maximum permissible concentration of pollutants in the atmospheric air of populated areas", approved by the Resolution of the Kyrgyz Republic Government of April 11, 2016 No. 20. Annex 17.			

Water quality criteria are defined by 3 general categories: fisheries, drinking water and wastewater discharge. Water quality criteria include:

(i) Hygienic norms of HN "Maximum Permissible Concentration (MPC) of Chemical Substances in Water of Water Facilities for Household, Drinking and Cultural-Household Water Use" approved by the Resolution of the Kyrgyz Republic Government of April 11, 2016 No. 20. Annex 16.

(ii) Hygienic Norms of the HN "Approximate Permissible Levels (APLs) of Chemical Substances in Water of Water Facilities for Household, Drinking and Cultural-Household Water Use" approved by the Resolution of the Kyrgyz Republic Government of April 11, 2016 No. 20. Annex 20.

[8] Dated January14, 1994 No. 1423-XII

International conferences

The Kyrgyz Republic has ratified the following international conventions in the field of environmental management:

1. Aarhus Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters, 1998;
2. Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, 1996;
3. Convention on Biological Diversity, 1996;
4. Convention on Long-Range Transboundary Air Pollution 2000;
5. United Nations Framework Convention on Climate Change 2000;
6. Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade, 2000;
7. Vienna Convention for the Protection of the Ozone Layer, 2000;
8. Montreal Protocol on Substances that Deplete the Ozone Layer, 2000;
9. Stockholm Convention on Persistent Organic Pollutants, 2002;
10. Convention on Environmental Impact Assessment in a Transboundary Context (Espoo Convention), 2001;
11. The 2003 Ramsar Convention on Wetlands;
12. Convention of the United Nations Economic Commission for Europe on access to information, public participation in decision-making and access to justice in environmental matters, year of accession: 2001;
13. United Nations Convention to Combat Desertification in Those Countries Experiencing Serious Drought and / or Desertification, Particularly in Africa, Year of Accession: 1999
14. Convention on International Trade in Endangered Species of Wild Fauna and Flora, year of accession: 2006;
15. Cartagena Protocol on Biosafety Year of accession: 2005;
16. Convention on the Protection of the World Cultural and Natural Heritage, year of accession: 1995.

ANNEX 6: GRIEVANCE REDRESS MECHANISM

6.1. Grievance Redress Mechanism (GRM) is a process of receiving prompt, objective information, evaluation and consideration of appeals (claims, suggestions, complaints, requests, positive feedback) related to ARIS projects.

In accordance with the Law of the KR "On the procedure of citizen's appeals" and internal regulations of ARIS work with the appeals, citizens/beneficiaries may send any appeals on the issues related to the implementation of ARIS projects at all implementation stages, including the Resettlement Program issues (to identify resettlement needs); follow the procedures of involuntary resettlement in accordance with the laws and regulations of the Kyrgyz Republic and WB OP policy 4.12 on Involuntary Resettlement. The appeals may be sent to ARIS via the following channels of Grievance Redress Mechanism:

1.Hotline (calls are received 24-hours; conversations will be recorded); 2. WhatsApp (a system of immediate text messaging for mobile devices with voice and video connections); 3. Social media (Facebook, Odnoklassniki); 4. ARIS web-site: www.aris.kg; 5. verbal or written appeal received during the on-site working meetings; 6.Incoming correspondence via ARIS reception; 7.Incoming correspondence via e-mail.	1. The appeal are fixed in the log of GRM incoming correspondence and considered provided that the following data is given: • name and surname; • registration and residential address or telephone number; • contents of the request; • other background information. 2. The appeal are entered into GRM configuration in 1C program to analyze and monitor. 3. The appeals may be submitted anonymously. The privacy shall be ensured in all cases including the case when the identity of a person submitting the request is known to avoid a conflict between the interested parties.

6.2. Grievance Redress Mechanism shall ensure flexibility and availability of using above-mentioned channels to the citizens/beneficiaries, anyone wishing to submit an appeal. The work with citizen's/beneficiaries' appeals is carried out by ARIS specialists responsible for the implementation of Grievance Redress Mechanism.

POPULATION AWARENESS-RAISING ON GRM

6.3.Information on Grievance Redress Mechanism will be disseminated to all beneficiaries and people having been influenced by ARIS projects via regular information channels (for instance, TV and radio companies, printed media, radio stations, news agencies, social media) including organization of meetings, roundtables, public hearings (including on resettlement or compensation), working meetings at all stages of ARIS projects implementation; and through ARIS GRM training module and other awareness sources.

6.4 ARIS will provide information on the scope of Grievance Redress Mechanism, eligibility criteria for submission of the appeals, procedure of appeal submission (where, when and how), deadlines of response, as well as the privacy principle and the right to submit anonymous appeals.

CONSIDERATION PROCESS BY ARIS GRM

6.5. When receiving an appeal, the following is defined:

- Type of appeal
- Category of appeal
- People responsible for the study and execution of the appeal.
- Deadline of resolving the appeal.
- Agreed action plan

6.6. After defining the type of appeal GRM specialist registers the details related to the appeal in the log of incoming correspondence and then in the GRM configuration in 1C program.

6.7. A person sending the appeal will receive a notification in which GRM specialist will inform the following via telephone or other GRM channels:

- Name and surname of the executor (project specialist) to which the appeal was forwarded
- Deadlines for the execution (minimum 30 days, maximum 60 days since the day it was registered)
- Deadlines and actions are determined in accordance with the ARIS GRM instructions on the work with the appeals.

Notification will be registered in the log of incoming correspondence. GRM specialist will help an appealing person at all stages of consideration and warrant that his appeal is considered in due manner.

6.8. In case if the citizen/beneficiary is not satisfied with the resolve received after the consideration he has a right to re-appeal. The appeal is considered by the ARIS special Review Committee. Executive director of ARIS will form the Review Committee from project managers and head of departments that will conduct appeal hearings. The Review Committee will consist of [X] people including [X] people from GRM and [X] people independent from project implementation unit and the Government of the KR.

6.9. After review of the appeal the citizen/beneficiary unsatisfied with the solution received has a right to appeal against the decision in court.

PUBLICATION OF THE APPEALS

6.10 After the APPEAL (applications, suggestions, complaints, requests, positive feedback) is resolved to encourage GRM use, measures taken to resolve the appeal will be published in mass media at the local level. Upon request the identity of an appealing person will be kept in secret.

REPORTING ON GRM PROGRESS

6.11 Quarter and annual reports of ARIS projects shall include Section related to Grievance Redress Mechanism which provides updated information on the following:

- Status of GRM formation (procedures, training, population awareness campaigns, budgeting etc.);
- Qualitative data on number of received appeals (applications, suggestions, complaints, requests, positive feedback), of them the appeals related to the WB policy OP 4.12 on Involuntary Resettlement and number of resolved appeals;
- Quantitative data on the type of appeals and responses, issues provided and remained unsolved;

- Level of satisfaction by the measures (response) taken;
- Any correction measures taken.

Annex 7

Checklist Environmental Management Plan for Construction and Rehabilitation Activities

General Guidelines for use of EMP checklist:

For low-risk topologies, such as school and hospital rehabilitation activities, the ECA safeguards team developed an alternative to the current EMP format to provide an opportunity for a more streamlined approach to preparing EMPs for minor rehabilitation or small-scale works in building construction, in the health, education and public services sectors. The checklist-type format has been developed to provide "example good practices" and designed to be user friendly and compatible with safeguard requirements.

The EMP checklist-type format attempts to cover typical core mitigation approaches to civil works contracts with small, localized impacts. It is accepted that this format provides the key elements of an Environmental Management Plan (EMP) or Environmental Management Framework (EMF) to meet World Bank Environmental Assessment requirements under OP 4.01. The intention of this checklist is that it would be applicable as guidelines for the small works contractors and constitute an integral part of bidding documents for contractors carrying out small civil works under Bankfinanced projects.

The checklist has three sections:

Part 1 includes a descriptive part that characterizes the project and specifies in terms the institutional and legislative aspects, the technical project content, the potential need for capacity building program and description of the public consultation process. This section could be up to two pages long. Attachments for additional information can be supplemented when needed.

Part 2 includes an environmental and social screening checklist, where activities and potential environmental issues can be checked in a simple Yes/No format. If any given activity/issue is triggered by checking "yes", a reference is made to the appropriate section in the following table, which contains clearly formulated management and mitigation measures.

Part 3 represents the monitoring plan for activities during project construction and implementation. It retains the same format required for EMPs proposed under normal Bank requirements for Category B projects. It is the intent of this checklist that Part 2 and Part 3 be included into the bidding documents for contractors, priced during the bidding process and diligent implementation supervised during works execution

CONTENTS

EMP Checklist for Construction and Rehabilitation Activities PART A: GENERAL PROJECT AND SITE INFORMATION

INSTITUTIONAL & ADMINISTRATIVE				
Country	COUNTRY			
Project title				
Scope of project and activity	Small construction works for buildings rehabilitation within *** project			
Institutional arrangements (Name and contacts)	WB (Project Team Leader)	Project Management	Local Counterpart and/or Recipient	
Implementation arrangements (Name and contacts)	Safeguard Supervision	Local Counterpart	Local Inspectorate	Contactor

		Supervision	Supervision	
SITE DESCRIPTION				
Name of site				
Describe site location			Attachment 1: Site Map [ ]Y [ ] N	
Who owns the land?				
Description of geographic, physical, biological, geological, hydrographic and socio-economic contex				
Locations and distance for material sourcing, especially aggregates, water, stones?				
LEGISLATION				
Identify national & local legislation & permits that apply to project activity				
PUBLIC CONSULTATION				
Identify when / where the public consultation process took place				
INSTITUTIONAL CAPACITY BUILDING				
Will there be any capacity building?	[ ] N or [ ]Y if Yes, Attachment 2 includes the capacity building program			
PART B: SAFEGUARDS INFORMATION				
ENVIRONMENTAL /SOCIAL SCREENING				
Will the site activity include/involve any of the following?	**Activity/ Issue**	**Status**	**Triggered Actions**	
	A. Building rehabilitation	[ ] Yes [ ] No	See Section A below	
	B. New construction	[ ] Yes [ ] No	See Section A below	
	C. Individual wastewater treatment system	[ ] Yes [ ] No	See Section B below	
	D. Historic building(s) and districts	[ ] Yes [ ] No	See Section C below	
	E. Acquisition of land6	[ ] Yes [ ] No	See Section D below	
	F. Hazardous or toxic materials7	[ ] Yes [ ] No	See Section E below	
	G. Impacts on forests and/or protected areas	[ ] Yes [ ] No	See Section F below	
	H. Handling / management of medical waste	[ ] [ ] Yes [ ] No	See Section G below	

	I. Traffic and Pedestrian Safety	[ ] Yes [ ] No	See Section H below

PART C: MITIGATION MEASURES

ACTIVITY	PARAMETER	MITIGATION MEASURES CHECKLIST
0. General Conditions	Notification and Worker Safety	(a) The local construction and environment inspectorates and communities have been notified of upcoming activities (b) The public has been notified of the works through appropriate notification in the media and/or at publicly accessible sites (including the site of the works) (b) (c) All legally required permits have been acquired for construction and/or rehabilitation (d) The Contractor formally agrees that all work will be carried out in a safe and disciplined manner designed to minimize impacts on neighboring residents and environment. (e) Workers' PPE will comply with international good practice (always hardhats, as needed masks and safety glasses, harnesses and safety boots) (f) Appropriate signposting of the sites will inform workers of key rules and regulations to follow.
A. General Rehabilitation and /or Construction Activities	Air Quality	(a) During interior demolition debris-chutes shall be used above the first floor (b) Demolition debris shall be kept in controlled area and sprayed with water mist to reduce debris dust (c) During pneumatic drilling/wall destruction dust shall be suppressed by ongoing water

		spraying and/or installing dust screen enclosures at site (d) The surrounding environment (side walks, roads) shall be kept free of debris to minimize dust (e) There will be no open burning of construction / waste material at the site (f) There will be no excessive idling of construction vehicles at sites
	Noise	(a) Construction noise will be limited to restricted times agreed to in the permit (b) During operations the engine covers of generators, air compressors and other powered mechanical equipment shall be closed, and equipment placed as far away from residential areas as possible
	Water Quality	(a) The site will establish appropriate erosion and sediment control measures such as e.g. hay bales and / or silt fences to prevent sediment from moving off site and causing excessive turbidity in nearby streams and rivers.
	Waste management	(a) Waste collection and disposal pathways and sites will be identified for all major waste types expected from demolition and construction activities. (b) Mineral construction and demolition wastes will be separated from general refuse, organic, liquid and chemical wastes by on-site sorting and stored in appropriate containers. (c) Construction waste will be collected and disposed properly by licensed collectors (d) The records of waste

		disposal will be maintained as proof for proper management as designed. (e) Whenever feasible the contractor will reuse and recycle appropriate and viable materials (except asbestos)
B. Individual wastewater treatment system	Water Quality	(a) The approach to handling sanitary wastes and wastewater from building sites (installation or reconstruction) must be approved by the local authorities (b) Before being discharged into receiving waters, effluents from individual wastewater systems must be treated in order to meet the minimal quality criteria set out by national guidelines on effluent quality and wastewater treatment (c) Monitoring of new wastewater systems (before/after) will be carried out (d) Construction vehicles and machinery will be washed only in designated areas where runoff will not pollute natural surface water bodies.
C. Historic building(s)	Cultural Heritage	(a) If the building is a designated historic structure, very close to such a structure, or located in a designated historic district, notification shall be made and approvals/permits be obtained from local authorities and all construction activities planned and carried out in line with local and national legislation. (b) It shall be ensured that provisions are put in place so that artifacts or other possible “chance finds” encountered in excavation or construction are

		noted and registered, responsible officials contacted, and works activities delayed or modified to account for such finds.
ACTIVITY	**PARAMETER**	**MITIGATION MEASURES CHECKLIST**
D. Acquisition of land	Land Acquisition Plan/Framework	(a) If expropriation of land was not expected but is required, or if loss of access to income of legal or illegal users of land was not expected but may occur, that the Bank's Task Team Leader shall be immediately consulted. (b) The approved Land Acquisition Plan/Framework (if required by the project) will be implemented
E. Toxic Materials	Asbestos management	(a) If asbestos is located on the project site, it shall be marked clearly as hazardous material (b) When possible the asbestos will be appropriately contained and sealed to minimize exposure (c) The asbestos prior to removal (if removal is necessary) will be treated with a wetting agent to minimize asbestos dust (d) Asbestos will be handled and disposed by skilled & experienced professionals (e) If asbestos material is be stored temporarily, the wastes should be securely enclosed inside closed containments and marked appropriately. Security measures will be taken against unauthorized removal from the site. (f) The removed asbestos will not be reused
	Toxic / hazardous waste management	(a) Temporarily storage on site of all hazardous or toxic substances will be in safe

		containers labeled with details of composition, properties and handling information (b) The containers of hazardous substances shall be placed in an leak-proof container to prevent spillage and leaching (c) The wastes shall be transported by specially licensed carriers and disposed in a licensed facility. (d) Paints with toxic ingredients or solvents or lead-based paints will not be used
F. Affected forests, wetlands and/or protected areas	Protection	(a) All recognized natural habitats, wetlands and protected areas in the immediate vicinity of the activity will not be damaged or exploited, all staff will be strictly prohibited from hunting, foraging, logging or other damaging activities. (b) A survey and an inventory shall be made of large trees in the vicinity of the construction activity, large trees shall be marked and cordoned off with fencing, their root system protected, and any damage to the trees avoided (c) Adjacent wetlands and streams shall be protected from construction site run-off with appropriate erosion and sediment control feature to include by not limited to hay bales and silt fences (d) There will be no unlicensed borrow pits, quarries or waste dumps in adjacent areas, especially not in protected areas.
G. Disposal of medical waste	Infrastructure for medical waste management	(a) In compliance with national regulations the contractor will insure that newly constructed

		and/or rehabilitated health care facilities include sufficient infrastructure for medical waste handling and disposal; this includes and not limited to: ♣ Special facilities for segregated healthcare waste (including soiled instruments “sharps”, and human tissue or fluids) from other waste disposal; and ♣ Appropriate storage facilities for medical waste are in place; and ♣ If the activity includes facility-based treatment, appropriate disposal options are in place and operational
H Traffic and Pedestrian Safety	Direct or indirect hazards to public traffic and pedestrians by construction activities	(b) In compliance with national regulations the contractor will insure that the construction site is properly secured and construction related traffic regulated. This includes but is not limited to ♣ Signposting, warning signs, barriers and traffic diversions: site will be clearly visible and the public warned of all potential hazards ♣ Traffic management system and staff training, especially for site access and near-site heavy traffic. Provision of safe passages and crossings for pedestrians where construction traffic interferes. ♣ Adjustment of working hours to local traffic patterns, e.g. avoiding major transport activities during rush hours or times of livestock movement ♣ Active traffic management by trained and visible staff at the site, if required for safe and convenient passage for the public. ♣ Ensuring safe and

		continuous access to office facilities, shops and residences during renovation activities, if the buildings stay open for the public.

PART D: MONITORING PLAN

Phase	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?)	Why (Is the parameter being monitored?)	Cost (if not included in project budget)	Who (Is responsible for monitoring?)
During activity preparation	site access traffic management availability of waste disposal facilities	at the site at the site in site vicinity	check if design and project planning foresee diligent procedures	before launch of construction	safety of general public, timely detection of waste disposal bottlenecks	marginal, within budget	Contractor, Engineer
During activity implementation	hazardous waste inventory (asbestos) construction material quality control (eg. paints / solvents)	on site Contractor's store / building yard	visual / analytical if in doubt visual / research in toxic materials databases	before start of rehabilitation works before approval to use materials	public and workplace health and safety	marginal, within budget; (prepare special account for analyses at PMU?)	Contractor, Engineer
During activity supervision	dust generation noise emissions wastewater volumes & quality waste types and	on site and in immediate neighborhood, close to potential impacted residents	visual consultation of locals visual, analytical if suspicious count of waste	daily daily daily / continuous every batch	avoidance of public nuisance avoidance of negative impacts on ground/ surface	marginal, within budget	Contractor, Engineer

	volumes		transport s off site		waters ensuring proper waste managem ent and disposal		

Annex 8: Summary on transformer oil with polychlorinated biphenyls (PCB)

The main function of transformer oil is to cool the power transformer, reactors, oil switch heated by electric current. This group of organic compound which includes the chlorine-substitution biphenyls derivatives - polychlorinated biphenyls (PCB). They were first synthesized in 1929. The peculiarity of these substances is heat-resistance and that they can be used as an isolation in electric technology. Colorless and odorless PCB are also chemically stable. PCB were first produced in USA by "Monsanto" Company in 1929. These oil liquids are incombustible and do not conduct the electricity, but they conduct the heat well. PCB are resistant to acid and alkaline impacts. Due to its properties, they have been extensively used in the function dielectrics in transformers and condensers, as a cooling liquid in heat exchange systems, in hydraulics, forming a part of plasticizers, paints, enamels, lubricating oils, plastics, carbon-paper, additives in household chemicals. In different countries they have been produced by various trademarks: Arochlor, Pyranol, Inertin in USE, Kanechlor, Sybalon in Japan, Parylene in France, Delor in Czechoslovakia.

PCB were produced in USSR since 1934 until 1995. They were produced under such trademarks as sovol, sovtol and gekhsol. The main manufacturer of sovols was the "Orgsteklo" manufacturer (Dzerzhinsk), "Orgsynthes" (Novomoskovsk) and pilot plant VNITIG (All union herbicides research institution, Ufa). Polychlorbiphenyls were filled in power, high-voltage, impulsive transformer that were produced in many cities of Russia.

Production of PCB is now almost entirely ceased in the whole world. To ensure prompt environmentally safe disposal of these substances, most countries singed the Stockholm Convention in 2001 on Persistent Organic Pollutants. Persistent Organic Pollutants (POP) – are the chemical substances, non-degradable or slowly degradable in natural conditions. The participants of this convention took the responsibility to completely dispose PCB that exist in their countries until 2028. Kyrgyz Republic ratified the Stockholm Convention on persistent organic substances in July 19th 2006.

PCB were not produced in Kyrgyz Republic. These substances could be imported to the republic territories as part of the electric equipment, transformer oils, paintwork materials, different lubricants. No import and export data of these substances is available due to a large number and types of electrical equipment, volumes and trademarks of transformer oils, paintworks and other materials. Such equipment as transformer condensate, transformer oils that may contain PCB, were identified by type and name of the equipment and oil brands.

However, the most dangerous impact of PCB on human is its mutagenic effect, which has a negative impact on health of future generations. The problem is that PCB do not virtually break down and they are capable to accumulate in biological objects and food products. PCB possess rather high toxicity level. It is proven that these substances have many-sided damaging impact on a number of organs and systems along with capability of long-term accumulation in fatty tissues. The hazard of PCB to human health is that they are a strong source of immune system suppression ("chemical" AIDS). Besides, the intake of PCB provokes cancer, liver, kidney and nervous system and skin damage (neurodermatitis, eczema, rash). If absorbed by embryo and baby, PCB may cause congenital deformities and child's pathology (backwardness, decrease in immunity, damage to the blood-forming organs).

By the time the world communities realized the danger, huge amounts of these combinations had already been produced (from 1929 till the middle of 1970s), and globally polluted the Earth with constantly circulating objects facilities) in the environment. If entered into the organism, the PCB is

easily absorbed through digestive tract, lungs, skin and accumulated in fatty tissues. In most samples of fatty tissues PCB content was 1 mg/kg or less, large amounts – up to 700 mg/kg – were found in human fatty tissues, that were occupationally exposed (concentration in blood – 0,3 and 200 micrograms/100 ml). Nevertheless, PCB are accumulated in human organism and can exude only in small amounts even over a period of many years. That's why it is necessary to adhere to strict safety measures when dealing with PCB.

PCB has a long and documented history of negative impact on nature. They are associated with downgraded reproductive functions and blocking the immune functions. 27 seals caught in Arctic indicate such defects. In 1986 the flood in Saginaw river basin in Michigan had let PCB-pollutants penetrate into the ecosystem; next year the hatching level of Caspian tern decreased by 70%. The hatched nestlings had abnormalities and couldn't survive more than 5 days. Otters in Switzerland became extinct by the reason of infertility.

PCB content identification by visual inspection of the transformers

Although the average service term of PCB-transformer is around 40 years and longer, such conditions as overloading and high operating temperature and physical impact may reduce its service life and entail operational and environmental risks. Preventative maintenance operations are very important to eliminate such dangers. The main function of transformers is to transform the current from one potential to another. During this process, the conversion heat necessary for efficient cooling is produced. The liquid used for that purpose must be a good cooler, as well as fine electric isolation (dielectric), which may be a mineral oil or PCB. The problem to identify the PCB of the transformer is that many types of transformers were designed and sold all over the world. Unfortunately, there is no absolute visual method to identify the type of the PCB transformer. Some Soviet manufacturers pointed out the dielectric liquid in the type and serial number. For example, some PCB contained in the transformers, produced in ex-USSR, are identified as TNZ, TNP, TNR

Picture 1: Manufacturer's plate of Russian PCB transformers

Example. The transformers produced in Chirikskiy Transformer plant: TNZ – 25/10, gross mass 490kg, 160 kg of Sovtol, TNZ – 40/10, 610/205, TH3 – 630/10, 3400/1100, TNZ – 1000/10, 5000/1800, TNZP – 400/10, TNZP – 630/10, TNZP – 1000/10, TNZP – 1600/10 and etc., Sverdlov transformer plant: TNP – 400/10, TNP – 800/10, TNP – 1600/10, TNPU – 1000/10 and etc.

Between 1958 and 1988 in Russia and Kazakhstan up to 1992, PCB containing condensers of different types and applications were produced as well as the small condensates containing PCB in the amount from 0.005 to 1.8 kg to be used in fluorescent lamps.

If the second letter of the condenser's type name is C, this means the presence of heatproof oil. The letter A means the presence of PCB.
As in the reactive power compensation installations produced in Ust-Kamenogorsk the KS0, KS1, KS2, KSK1, KSK2, KSTS condensates were applied, the PCB-liquid was also included – TCB (trichlorebenzene). In the electric transport manufactured in Serpuhova, the condensates KS, KSK, FST, FS, GTS and others, containing sovol and TCB. Fluorescent lamps from Leninakana with LS, LSM, LSE1, LSE2 condensates with sovol, TCB. In transformative plants, condensates like PS, PSK, containing sovol and other.

Dismantling the PCB transformer, safety measures and environmental protection
When decommissioning the PCB containing equipment, all technical and organizational measures are taken for safe work performance. In practical terms, the decommissioning starts with logoff procedure carried out in accordance with local safety regulations for handling the electrical equipment and manufacturer's instruction (if available). Before starting to work with transformers, it is necessary to ensure that transformer is turned off on the low and high voltage side, that the incoming and outgoing lines are short-circuited and visually and safely grounded on the work position and that the contact-breaker panel marked with clear sign **"do not turn off, works in progress"**. Besides, it is necessary to make sure, that the access to transformer does not represent any risk.
The working area shall be isolated with red and white plastic tape, in order to avoid unauthorized access. The fire extinguisher must be installed in an appropriate place of the site, ready to be used in case of fire risk.
hermetically seal these leaks to prevent further crossed contamination. Also, remove all visible contaminations from metal parts, for example, using the acetone, to provide safe operation in the future.
If there are no leaks or defects of the transformer, and its surface is clean and depletion did not occur at the site, then the decommissioning may be carried out in standard safety work clothing. It is allowed to fill the same barrel with oil that contains PCB from different transformers, if PCB content or similar concentration is marked. If there are no data on PCB content in oil, then the oil is considered to be contaminated with PCB and the barrels with undefined oil must be marked as contaminated with PCB.
After decommissioning the PCB containing equipment, the owner of such equipment and wastes safely and temporary stores them for further transportation to the central warehouse and detoxification and disposal.
Small-sized equipment of the performance type (for example, condensates) that remained leak-proof are dismantled from its operation sites and packed as a whole without opening and PCB draining. Large-sized equipment must be drained off of PCB in order to avoid leaks during transportation.
While dismantling and transporting, it is recommended to empty the transformer at its location in advance ***in accordance with detailed action plan*** and provide all required equipment, such as, PCB pumps, barrels, personal protective equipment and tools, to avoid the risk of PCB containing cooling liquid loss.
Before draining the oil, it is necessary to take safety measures in case of spilling: cover the ground by one or two layers of canvas of increased strength and set the containment basin under main parts, such as: oil pump, box coupling, and etc. It is also recommended to have absorbents ready, such as: sand, cement mixture.

Due to fluctuation (glutinosity) of PCB containing cooling liquid, there may be some difficulties when opening the drain tap. This fact is necessary to be considered in advance, to resolve the situation in the best possible way. If the tap is impossible to open, empty the transformer through the oil filling hole or by dismantling the isolation.

The transformer must be mounted at a certain angle till its fully empty, to get as much cooling liquid as possible. It is necessary to take into consideration that after emptying, some amount of oil in the transformer will remain, and may then vaporize from windings in course of time. The drain tap must be closed until the draining is completed and where possible the transformer should be filled with absorbent to retain the remnants of oil. After removing the transformer from protecting cover, visually inspect the area and if necessary clean the floor, tranches and walls, and the rest cables before mounting new transformer.

All staff assigned to deal with PCB must be well instructed on proposed action plan regarding safety measures, use of equipment ensuring the safety, and applicability of state norms.

As far as possible, the PCB liquids must be transported by means of pump used to reduce dissemination and losses caused by leaks. It is necessary to use the radial-flow pump with all wetted surface made of stainless steel. Shaft packing must be with carbon rings of external type to limit the destructive impact of PCB on gasket material. Valves must be made of copper or covered with stainless steel. The sleeve must be made of flexible metal or covered with tetrafluorethylene or silicon polymers, and the containment basin must be placed under all pumps, valves and clutches for sleeve connection.

When dealing with PCB, all required safety measures must be taken in order to prevent pollution of the environment.

The samples of the equipment or materials potential to contain PCB must be carefully taken without spilling or losing. If the backing block is required, the oil absorbing carpet is used.

All working materials must be cleaned with acetone or disposed as hazardous wastes, including personal protective equipment (PPE). Objects made of glass or metal may be totally cleaned; synthetic material, objects made of plastic and wood and etc. could not be cleaned and must be disposed as hazardous wastes.

When interfering with equipment that has leakage or which is in bad condition, it is necessary to prevent the leak or contamination.

In the areas of spills: contaminated area must be marked and fenced off. The clothes and boots must be changed in the designated place (room) when entering and exiting the contamination area. If possible, the leak must be detected and hermetically sealed, for example with joint sealing. Besides, the decommissioned equipment that develop a leak must be placed in steel barrel or containment basin, in worst case, absorbing tissues shall be put around the equipment and the replacement must be performed in the closest time.

In case of leak due to damaged equipment, install an appropriate containment basin. Small amount of leaks must be hermetically sealed, and when performing these actions relevant equipment for ensuring safety must be used. In this regard it is recommended to keep the respective material (containment basin, rubber gloves, hermetic material) close to such equipment.

Visually detected contaminated soil or concrete must be dismantled as soon as possible to prevent further contamination. The surface of the objects (transport vehicles, sidewalks, buildings and etc.) must be cleaned using the materials absorbing the oil, and the surfaces must be wiped with solvent. After cleaning, the surfaces must be chemically checked on the results of cleaning process. The material used for cleaning must be place in barrels for disposal.

Marking. All barrels, containers and equipment containing the PCB, PCT and PBB or contaminated with such, must be clearly marked with a caution label, as well as with the label containing such information about this equipment or barrels. These information includes the data on barrel content or equipment configuration (exact amount of equipment or volume of liquid), type of wastes, name of place, origin of the wastes in order to provide the opportunity to track the data of recurrent package, where required, and also the name and telephone number of the responsible person.

Package. Before placing to the warehouse or transporting wastes containing the PCB, PCT or PBB, they must be packed in boxing:

a) Liquid wastes must be placed, for example, in steel barrel with double gap closure;

b) Movement and transportation of wastes is performed in accordance with KR Government Regulation №885 from 25.12.2015 «Procedure for dealing with hazardous wastes», which is why containers must correspond to the requirements related to transportation, taking into account the possibility of its future use for the same purpose;

c) Large-sized drained equipment is stored without package or packed in a big container (external isolating barrel), or in thick plastic case, if there is a risk of contamination;

d) Small-sized equipment with liquid or emptied must be placed in barrels with absorbent materials. One barrel may contain big number of small-sized equipment, in case of sufficient absorbent materials inside of it. Loose absorbent may be procured from suppliers of specialty goods, related to safety measures. Rasping and sand can also be used;

e) Barrels and equipment may be mounted on the containment basin for movement using the forklift truck and for storage. Before moving the containment basin, the barrels and equipment must be fixed with lashing straps.

Temporary storage of PCB containing equipment and wastes.

Owner of PCB containing wastes stores them on the production areas or special rooms for not more than 12 months since its placement.

Technological instructions on dismantling and transportation of the transformer.

Disconnect the tire and descents from the taps, power and control cables from the motors and gears, transformer grounding. Perform a partial dismantling of the fire protection system.

Perform an external transformer inspection to identify defects, mark with chalk any leakage points. Draw up a statement of inspection for defects (if necessary).

Shut off gates and valves between the heat sinks and the transformer tank.

Clean the exterior surfaces of the contact input terminals from dirt.

Mark all the rails the points of coupling with rollers of the carriages of the transformer, lift the transformer with jacks from the expander side, remove the gaskets providing the slope of the transformer on the axis of the gas relay location. Inspect the carriages and rollers, brush roller axis. Lower transformer on the rails to check the reliability of fixing of carriages to the bottom of the tank.

Secure units of the pulley block to the anchor and special structure on the transformer to move it along the transverse axis. Gradually unwinding the cable from the winch drum, pass it through a snatch block, charge the pulley block, secure the end of the rope through the ear in the block and strengthen the slack in the pulley block. Carefully check the condition of the carriages and rolling paths.

Check the joints on the crossings of tracks, set insertions at the junction of rail crossings and fix them.

Move the transformer as follows:

Move the transformer from the foundation onto the rotation crosspiece;

lift transformer to 150 mm, turn the carriage to 90 °, lower the transformer, fix the carriages, rearrange the insertions in the crosspieces, rearrange the pulley block.

move the transformer to 40 - 50 m and rearrange the pulley block.

Operations for turning rollers and rolling along the longitudinal and transverse axes should be repeated all through the rolling path. Transformer should be rolled smoothly, without jerks, at a speed not exceeding 8 m / min.

Tractive effort should be directed towards the axis of rails.

Raising of the transformer by means of hydraulic jacks should be carried out smoothly, monitoring by pressure gauges, installed on these jacks, distributing the loan evenly on the jacks. Hydraulic jacks should be installed only in areas specified in the transformer technical documentation. The installed hydraulic jacks should have the safety nuts on the piston crowns. The connecting hoses must be pre-tested and tested and have no twists.

In some cases, it is allowed to move the transformer in a partially disassembled state.

Disposal of transformer oil.

Among the many kinds of wastes to be disposed of, the transformer oil should be mentioned separately. The main task of the transformer oil is to cool power transformers, reactors, oil circuit breakers, which get heated by the electric current. The main requirement for transformer oils is their purity, that is, the absence of extraneous fibers and water that gradually reduce its resistance to electricity. With continuous care, regular cleaning and removal of the oxidation products of oil can last up to 25 years. Although transformer oil recycling is a cost-effective procedure, companies seek to minimize the volume of waste oil, which is achieved by means of special separation technology, filtration and recovery for extending the working life of oils.

Over time, the transformer oil loses its original quality as a result of accumulation of oxidation of oil products different impurities and pollutants. The polluted transformer oil must be disposed of and replaced with new oil as it ceases to meet the relevant technical standards. Used oils represent a serious danger to the environment, so the transformer oil recycling is a necessary stage in the oil exploitation process completion. Non-recycled waste oil can become the source of water pollution that affects the quality of water and the local ecosystem as a whole. It is also worth mentioning the dangers of fire oils, which would emit into the air substances hazardous for human and animal life. This reinforces the need for disposal of transformer oil.

The main methods used for disposal of transformer oil are recycling, incineration and recovery.

Among these methods, recovery is the most advantageous method.

Recovery is a multistage process of purification of the transformer oil: Removal of mechanic impurities and water, evaporation, and adsorbent cleaning. Following this process, the base oil identical to the fresh one is recovered, and its yield is 80-90%.

Various methods of cleaning processes are high-tech, but it is often cheaper than to process and burn the old oil and the buy new one.

Used transformer oil is a valuable raw material, as it is not only a waste that must be destroyed, but also a product to be reused. It becomes possible to reuse it after processing oils to remove impurities and pollutants from it using a variety of technological operations. Thus, transformer oil recycle

economically advantageous due to the fact that when it is processed for reuse it requires several times less energy and raw material than for the primary production of transformer oil from petroleum oils.

Transformer oil is disposed of by the National Electricity Grid of Kyrgyzstan. Should PCB detected in the transformer oil, it undergoes partial treatment and disposal.