“CENGIZ ENERJI SAN. VE TIC A.Ş.”

Construction of combined-cycle gas turbine power plant with a capacity of 550 MW

Environmental and Social Impact Assessment

Final report

Book 1

125-1105-ESIA

REGISTRY OF DOCUMENT VERSIONS

Item	Version	Date	Status
1.	125-1105-ESIA Version_P0	07/04/2024	Preliminary version of the Report sent to “CENERGO” LLC

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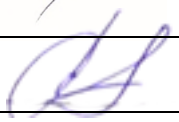
Chief sociologist	B. Mavlyanov	
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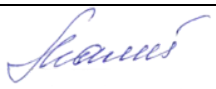
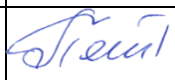
Ecologist/Atmospheric air specialist	N. Limankina	
Chief ecologist	G. Petrayeva	
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TERMS AND DEFINITIONS

Associated facilities	Associated facilities are facilities that are not financed by the project and that would not have been built or expanded, if the project had not been implemented, and without which the project would not be viable (IFC Performance Standard 1)
Impact on the environment and social conditions	Environmental and social impacts refer to any change, potential or actual, to the physical, natural, or cultural environment, and impacts on the surrounding community and employees, resulting from the business activity to be supported (IFC Performance Standard 1)
Stakeholder	A person or an organization that may influence, be influenced by, or perceive themselves to be influenced by activities or decision-making
The Customer, and the initiator of the planned activity, and the Company	"CENGIZ ENERJI SAN. VE TIC A.Ş"
Area of influence	An area that may be affected by: (i) the project, its activities and facilities of the Customer, directly operated or managed by it (including its contractors) and included in the Project; (ii) the impacts of unplanned but foreseeable circumstances caused by the Project that may occur at a later time or somewhere else; or (iii) indirect impacts of the Project on biodiversity or ecosystem services upon which the affected communities livelihoods are dependent (IFC Performance Standard 1)
Zone of influence of pollutant emissions into the atmosphere	The territory formed by the isoline of concentration equivalent to 0.05 MPC for all sets of sources of chemical pollution of atmospheric air for all pollutant emissions
Initiator of the proposed activity	A legal or natural person who intends to carry out the proposed activity and who is responsible for preparing the documentation for the activity in accordance with the regulatory requirements for this type of activity, in order to obtain the relevant permits
Critical habitat	Critical habitat is an area that has high biodiversity value, including (i) sites required for the survival of critically endangered and(or) endangered species or areas with special significance for endemic or restricted-range species; (iii) sites that are critical for the survival of migratory species and(or) schooling species with global significance; (iv) highly endangered ecosystems and(or) unique ecosystems and(or) (iv) territories associated with key evolutionary processes (IFC Performance Standard 1)
Cumulative impacts	Impacts arising from additional impacts on the scope of activities or resources used in or directly affected by the project as a result of other existing, planned or realistically determined circumstances during the identification of risks and impacts; generally recognized as significant based on scientific opinion and/or based on the affected communities' concerns (IFC Performance Standard 1)
Makhalla	Makhalla – residential quarter of a city, usually forms a community and a self–governing administrative unit of residents. Makhalla in a broad sense refers to a district or a local community. Promoting it as a 'traditional institution', the Uzbek government has embraced makhalla as a 'fundamental unit' of society. Makhallas were legitimised into law in 1993 under the Law on Institutions of Self-Government of Citizens, otherwise known as the Makhalla Law. Almost every Uzbek technically belongs to a makhalla and in general no one can be excluded based on class, profession or religion. (https://uzbekistangid.ru/kultura/chto-takoe-mahallya-v-uzbekistane)

Environmental and social impact assessment	A set of works that includes the identification, prediction and assessment of the planned activities impact on the components of the environment and socio-economic conditions, including the analysis of alternative options for planned activities, identification of conditions for their implementation and development of measures in the field of environmental and social management, accompanied by the disclosure of relevant information about the activities and consultations with stakeholders
Post-project analysis	Monitoring activities during construction and operation of facilities, monitoring compliance with stipulations and requirements, monitoring the effectiveness of measures to prevent/minimise impacts, comparing the conclusions of the environmental impact assessment with actual impacts, and developing additional measures (if necessary)
Project	Intended activity - UMK project 'Construction of a Casting and Rolling Complex'
Recipient(s)	Component(s) of the natural or social environment affected by the proposed activity, in particular: the natural environment and its individual components; population, individual social groups, objects of cultural heritage, etc.
Territories with normalized indicators of the quality of the human habitat	Territories in which hygienic standards of atmospheric air should be provided for chemical, biological and physical indicators of the quality of the human habitat: any residential development; educational and children's institutions; sports facilities and playgrounds; playgrounds; recreational areas; medical-preventive and health-improving institutions of general use resorts, sanatoriums, rest houses; horticultural associations, collective or individual suburban and gardening plots
Khokimiyat	Administration of the city or district
Environmental aspect	An element of an organization's activities, products or services that interacts or may interact with the environment (ISO 14001:2015)

ABBREVIATIONS

TCFD	Task Force on Climate- related Financial Disclosures
LLC	Limited Liability Company
EBRD	European Bank for Reconstruction and Development
IAAP	Index of the atmospheric air pollution
RES	Renewable energy sources
ICO	International credit organizations
MRCC	Mechanism for receiving and considering complaints
IFC	International Finance Corporation
ESIA	Environmental and social impact assessment
ACI	Assessment of cumulative impacts
EHS	General Environment, Health and Safety Guidelines
OECD	Organisation for Economic Co-operation and Development
SEP	Stakeholder Engagement Plan
GHGs	Greenhouse gases
MPE	Maximum permissible emission
MPD	Maximum permissible discharges
PSW	Project environmental standards for the generation and disposal of waste
MPC	Maximum permissible concentrations
MPCmo	Maximum allowable concentration of a pollutant in the atmospheric air, maximum one-time
MPCad	Maximum permissible concentration of the pollutant in the atmospheric air, average daily
RCM	Resolution of the Cabinet of Ministers
RUz	The Republic of Uzbekistan
SanR&N	Sanitary rules and norms
PS	Performance standards
SPZ	Sanitary protection zone
PRS	Public relations specialist
TNIQ	Territories with normalized indicators of the quality of the human habitat
Uzhydromet	Center of the Hydrometeorological Service of the Republic of Uzbekistan
AACI	Accelerated assessment of cumulative impacts
VESC	Valuable environmental and social component
ECA	Export credit agencies

1 INTRODUCTION

The Environmental and Social Impact Assessment (hereinafter - ESIA) for the project “Combined-cycle gas turbine power plant with a capacity of 550 MW” (hereinafter - the Project of combined-cycle power plant) for CENGIZ ENERJI SAN. VE TIC A.Ş (hereinafter - Customer) is conducted in accordance with the requirements of the International Finance Corporation (hereinafter - IFC) to attract project finance.

The project provides for the construction of a Combined-cycle gas turbine power plant with a capacity of 550 MW consisting of 1 gas turbine unit (GTU) “Siemens S SGT5-4000F V10”, 1 unit of a steam turbine (ST) “Siemens SST-700/900”, with a capacity of 185.3 MW, manufactured in Germany, with the necessary buildings and auxiliary facilities and with the creation of an appropriate infrastructure on the territory of a combined-cycle gas power plant with a capacity of 550 MW in Sharaf-Rashidov district, Jizzakh region. The total generation of electric energy from the combined-cycle power plant will amount to 4 000 000 MWh per year.

The total area of the allocated site for the construction of a combined cycle power plant is 9.43 hectares.

The territory for the construction of the gas turbine power plant will occupy 2.91 hectares, 3.65 hectares will be used for parking spaces, roads inside the facility, and a customs clearance area. 2.83 hectares will be allocated for landscaping, the general master plan of the enterprise is presented in (Figure 1).

The project provides for the construction of off-site facilities: a new access road with a length of about 90 meters, and 2 power lines of 220 kV (overhead lines, power lines) with a length of about 7 and 9 km from the designed power plant to the existing substations, the route of the gas pipeline and water supply has not been determined for the period of environmental design.

During the construction of the power plant, about 650 builders will work on the territory of the construction site, 600 of them are employees, 50 are engineering and technical personnel.

At the first stage of the ESIA, a preliminary assessment of the planned activities was carried out based on materials provided by the Customer, information collected in open (available) sources, as well as based on data from analogue facilities. As a result of these works:

- applicable national and international ESIA requirements have been identified;
- the collection, processing and analysis of available information on the natural and socio-economic conditions of the area of the planned activity was completed;
- impact recipients identified;
- stakeholders have been identified;
- initial consultations with stakeholders were held;
- preliminary identification and assessment of the impacts of the planned activity;
- categorization of the project has been carried out.

The results of the preliminary assessment are documented in the preliminary environmental and social assessment report – Scoping report, report code 125-1105-SR.

Scoping report agreed upon by “CENGIZ ENERJI SAN. VE TIC A.Ş.” and creditors in May 2024

As part of the disclosure of information on the project, the materials of the preliminary assessment and the EPA are posted on the Customer’s website for review by interested parties.

In April – June 2024, in order to assess the impacts and develop measures to prevent and/or minimize negative impacts, the Consultant implemented a set of works provided for by the TR for the ESIA. Works included:

- baseline studies;
  - assessment of chemical pollution of atmospheric air;
  - assessment of the state of soils and grounds;
  - assessment of the state of surface and ground waters;
  - biological diversity research;
  - acoustic research;
  - socio-economic research;
- collection of initial data:
  - meteorological and climatic data;
  - data on water use and waste management system;
  - information about cultural heritage sites;
- special types of research:
  - traffic intensity analysis.

The work at this stage resulted in following:

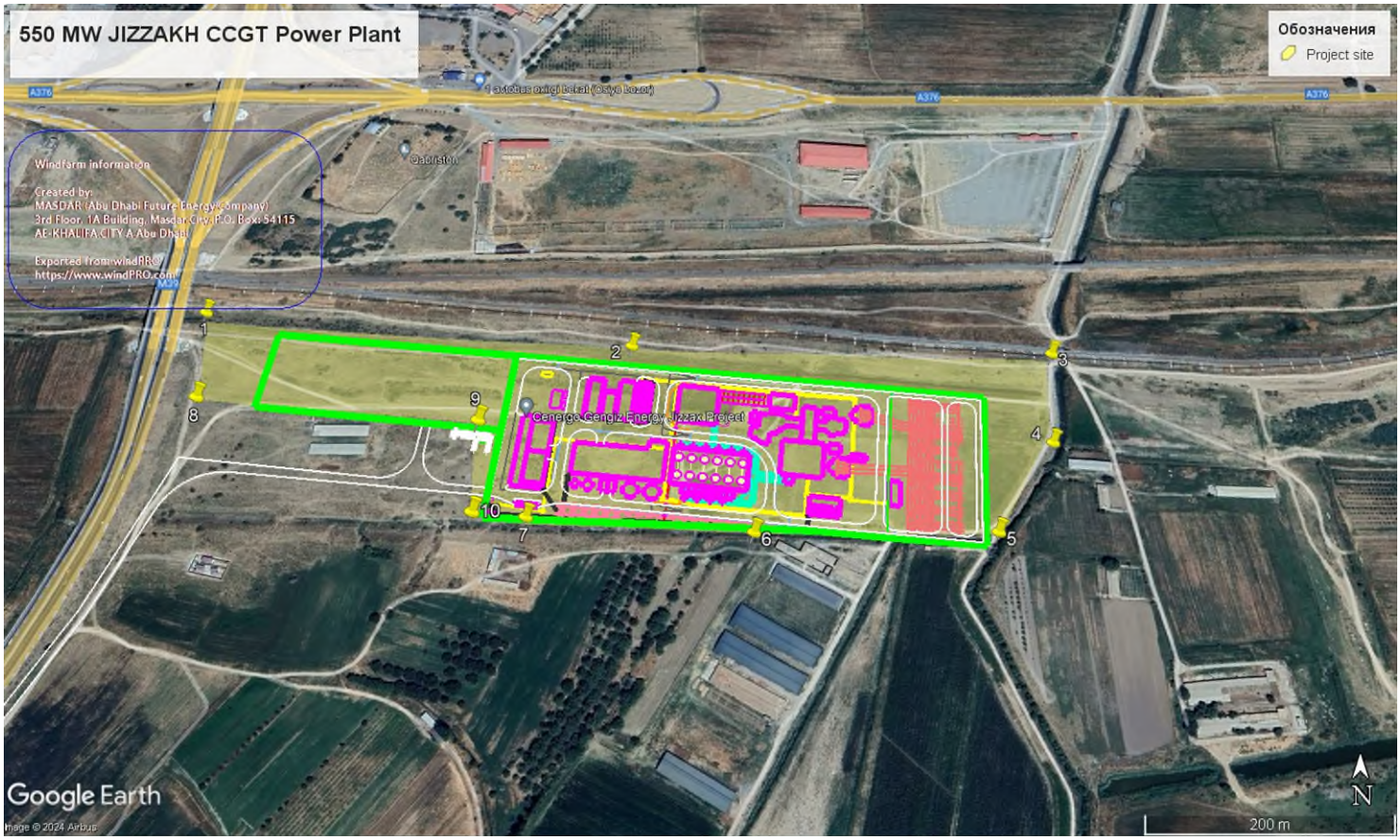
- methodological approaches to impact assessment have been substantiated;
- the initial environmental and social conditions of the zone of influence of the planned activity are determined;
- assessment of the impacts of the planned activities on the environment and social conditions has been carried out;

- set of measures to prevent and/or minimize negative impacts is justified;
- planned activities for interaction with stakeholders have been implemented.

1.1 Brief description of the planned activity

The territory of the 550 MW combined-cycle power plant includes an industrial site in Sharaf-Rashidov district (Jizzakh region), the main technological divisions of the enterprise are located at the site in the eastern part of Jizzakh city (5.5 km) (*Figure 1.1.1*).

Figure 1.1.1. - Area of planned activity



The total generation of electric energy at the power plant will be 4 000 000 MWh per year.

It is planned to install a Siemens “Siemens SGT5-4000F V10” gas turbine unit (GTU) with a capacity of 365.3 MW (50 Hz), manufactured in Germany (1 unit) on the allocated territory.

Also, at the planned power plant, electric energy will be generated using a steam turbine (PT) “Siemens SST-700/900”, with a capacity of 185.3 MW, manufactured in Germany (1 unit).

The impacts of the following power plant facilities are considered within the framework of the ESIA:

- gas turbine unit (GTU) “Siemens SGT5-4000F V10”, with a capacity of 365.3 MW (50 Hz)
- steam turbine (ST) “Siemens SST-700/900”, with a capacity of 185.3 MW
- water treatment plant;
- waste heat boiler
- water-cooling condensers
- transformers

The associated project objects are under discussion and design at the time of the start of the ESIA research:

- new access road to the power plant with a length of about 90 meters is displayed on the general master plan;
- 2 power lines with a length of approximately 8 and 10 km from the project area to the existing 220 kV overhead lines L-20-D and L-Z-C. – draft scheme for the power output of a thermal power plant with possible connection options has been developed.
- Gas pipeline – design has not been started, at the discussion stage.
- Water supply route- design has not been started, at the discussion stage. Preliminary surface water intake has been determined - the Jizzakh reservoir.

In this regard, the ESIA studies on associated facilities were carried out taking into account the limitations of the available data.

1.2 Purpose and objectives of the ESIA

According to the terms of the Agreement between the Consultant and “CENGIZ ENERJI SAN. VE TIC A.Ş.”, the ESIA is carried out in accordance with the requirements of the IFC.

IFC Performance Standard 1 (hereinafter referred to as the PS) “Assessing and Managing Environmental and Social Risks and Impacts” defines the following objectives:

- identification and assessment of environmental and social risks and impacts of project implementation;
- adoption of a hierarchy of warning and prevention mechanisms, or, if this is not possible, minimizing and, if residual impacts persist, compensating/reimbursing the consequences of risks and adverse impacts on employees, affected communities and the environment;
- stimulating the improvement of the environmental and social performance of customers through the application of effective management systems.
- ensuring that complaints from affected communities and communications from other stakeholders are answered and that issues raised in them are appropriately addressed;
- facilitating appropriate engagement with affected communities throughout the life cycle of the project on issues that may potentially affect them, providing appropriate funds for this, and ensuring the disclosure and dissemination of relevant environmental and social information on the project.

To achieve these goals, the following tasks have been completed within the framework of the ESIA project:

- analysis of the initial state of the components of the environment and the socio-economic conditions of the area of the planned activity;
- characteristics of the sources of the project’s impacts on the environment and social

conditions;

- identification and analysis of the impact of the planned activity on the environment and social conditions;
- forecast of the state of the environmental components of the area and the socio-economic conditions of the area of the planned activity during the implementation of the project;
- development of measures for warning and prevention or, if this is not possible, minimization of negative impacts and related consequences, assessment of their effectiveness;
- preparation of proposals for monitoring the state of environmental components and socio-economic conditions of the area of planned activities.

Based on the results of this stage of work, it is envisaged to create an Environmental and Social Management System for the project, based on the existing management system of the project company and supplemented with the necessary action plans and the corresponding organizational structure. The plans will take into account the results of the ESIA.

1.3 Sources of information

To solve the problems mentioned above, the following materials were used.

I. Documentation provided by the Customer

- Project documentation:
  - The Project of Environmental Impact Statement (PEIS) for the construction of a 550 MW combined-cycle power plant in Sharaf-Rashidov district, Jizzakh region.
  - Power distribution scheme in connection with the construction of a new 550 MW thermal power plant (TPP) in the Jizzakh region No. 2310-2;
  - conclusions of the State ecological expertise and authorized bodies in the field of environmental protection;
  - technological schemes of production, description of technology, technological regulations;
  - Report of the preliminary assessment of the ground and geotechnical characteristics of the construction site;
  - Technical proposal of NEM Energy B.V for the supply of equipment;

– Siemens Energy technical proposal for the supply of equipment.

The Consultant is under no circumstances responsible for the completeness and reliability of the source data provided by the Customer.

II. Open source data

- General plan and urban planning documents of the Jizzakh region, available online on the SUPC geoportal of the Republic of Uzbekistan https://dshk.uz/main #;
- The open map data of the OpenStreetMaps portal used under the Open Data Commons Open Database License (ODbL) from the OpenStreetMap Foundation (OSMF), available on the portal https://www.openstreetmap.org/ а также https://nextgis.com/;
- Remote sensing data available online through the Google Maps service https://www.google.com/maps.
- FAO AQUASTAT Country Profile - Uzbekistan, Food and Agriculture Organization of the United Nations, 2020

III. Baseline studies results

In April - June 2024, the Consultant performed baseline studies, the results of which collected the following data on the area of planned activity:

- socio-economic characteristics;
- chemical pollution of atmospheric air;
- pollution of soils and grounds;
- state of surface and ground waters;
- biological diversity (flora and terrestrial fauna);
- acoustic environment.

The results of the baseline studies are summarized in the reports attached to the ESIA materials.

1.4 Limitations and assumptions

The conclusions of the assessment are based on the Consultant's professional experience, which makes it possible to analyze design solutions for compliance with the requirements in the field of environmental protection established by the legislation and by-laws of the Republic of Uzbekistan, as well as the IFC requirements proposed for accounting by the Customer.

The assessment was carried out solely on the basis of the documentation provided by the Customer, taking into account data and information obtained from open sources (information about the public reaction in connection with the implementation of the project, data on the state of the natural environment, materials from public cadastres, etc.) and baseline studies materials.

Under no circumstances will the Consultant be responsible for possible deficiencies in the ESIA materials related to the quality and/or relevance of the source data provided by the Customer.

Associated facilities (projects) of the project are an access road to the power plant with a length of about 90 meters and power lines with a length of 8 and 10 km, a gas pipeline and a water supply (for more information, see section 4).

As of June 2024, associated facilities are under discussion and initial design, there is

no data on exact and approved routes.

Thus, in relation to associated facilities, information reflecting the current status of projects is presented in the materials of the ESIA:

- environmental and social impact assessment is not carried out;
- action plans to prevent/minimize negative impacts on the environment and social conditions are not developed;
- measures to monitor the impact on the environment and social conditions are not substantiated.

To assess the fulfillment of the requirements of SD-5, the following are carried out:

- retrospective assessment of the implementation of procedures related to the acquisition of rights to a land plot for the construction of an object (socio-economic audit);

1.5 Report structure

ESIA Report (Preliminary Report) consists of three books:

- book 1 of the ESIA report (this document) contains general information about the project and the work carried out within the framework of the ESIA (goals, objectives, limitations, research methodology);
- book 2 of the ESIA report (125-1105-ESIA-P0-2) was prepared based on the results of baseline studies carried out as part of a separate stage of work, and is devoted to consideration of the environmental and social conditions of the area of the proposed activity. Specifically, book 2 provides the following information:
  - natural conditions of the area of planned activity:
    - climate;
    - relief;
    - engineering-geological conditions;
    - the groundwater;
    - soil;
    - vegetation;
    - animal world;
    - territories with special conditions of use;
  - assessment of the existing ecological state of the area of planned activity:
    - atmospheric air quality;
    - the impact of physical factors;
    - acoustic environment;

  - vibration environment;
  - quality of surface and ground waters;
  - soil;
- socio-economic conditions of the area of the proposed project activity;

- book 3 of the ESIA Report (125-1105-ESIA-P0-3) contains:
  - forecast of the state of the environmental components of the area and the socio-economic conditions of the area of the planned activity during the implementation of the project;
  - proposals for measures to warn/prevent or minimize negative impacts;
  - proposals for monitoring the state of environmental components and socio-economic conditions of the area of planned activities.

Table 1.5.1 provides information for reference on individual reports prepared during the implementation of various, including baseline studies within the framework of the ESIA project, supplementing the ESIA report.

Table 1.5.1. - The composition of the studies carried out within the framework of the ESIA project

Item	Name of the document	Code	Note
1.	- Studies of the state of atmospheric air. Monitoring of chemical pollution of atmospheric air - Acoustic research - Research of grounds, surface and groundwater	125-1105-BIO	-Monitoring results using the Zephyr sensor -Results of measurements of noise, vibration and infrasound Research results: - soils (grounds) - surface and groundwater
2.	Research of the plant world	125-1105-BIO-Flora	Results of geobotanical research
3.	Animal world research	125-1105-BIO-Fauna	The results of zoological studies of terrestrial wildlife

2 REQUIREMENTS FOR THE PLANNED ACTIVITY AND ESIA

2.1 National legislation

2.1.1 Environmental and social policy

The Republic of Uzbekistan has created a national environmental, legal and institutional framework, regulated by the state policy in the field of nature protection and national guidelines to promote the sustainable use of natural resources and environmental protection, based on the following principles:

- the priority of protecting the health of human life.
- integration of economic and environmental policies aimed at preserving and restoring the environment as a necessary condition for improving the living standards of the population;
- transition from the protection of individual natural elements to the general and integrated protection of ecosystems;
- the responsibility of all members of company for environmental protection and biodiversity conservation.

The country is a party to a number of international and regional environmental agreements and conventions.

The Constitution of the Republic of Uzbekistan and environmental legislation establish the right of citizens to the safe environment. National legislation provides for a number of other environmental rights and obligations of citizens, which can be realized through individual or public efforts to protect the environment.

2.1.2 Legal framework in the field of environmental protection

The following key laws form the national environmental legal framework of Uzbekistan.

Table 2.1.1. - Normative-legal acts, normative-technical and instructional-methodological documents of the RUz, the requirements of which are taken into account during the implementation of the ESIA project

Regulatory level	Name of documents
Basic Law of the RUz	Constitution of the Republic of Uzbekistan, 1992
Normative-legal acts in the field of protection	Law of the RUz “On sanitary and epidemiological welfare of the population”, 2015
	Law of the RUz “On nature protection”, 1992
	Law of the RUz “On water and water use”, 1993
	Law of the RUz “On the protection of atmospheric air”, 1996
	Law of the RUz “On the protection and use of wildlife”, 1997
	Law of the RUz “On the protection and use of flora”, 1997
	Law of the RUz “On protected natural territories”, 2004
	Law of the RUz “On subsoil”, 1994
	Law of the RUz “On the protection of groundwater”, 1993
	Law of the RUz “On state land cadastre”, 1998
	Law of the RUz “On waste”, 2002
	Law of the RUz “On environmental expertise”, 2000
	Law of the RUz “On environmental control”, 2013

Level of regulation	Name of documents
	Decree of the President of the Republic of Uzbekistan “On approval of the concept of environmental protection of the Republic of Uzbekistan until 2030” No. DP-5863 dated on 30/10/2019
	Resolution of the President of the Republic of Uzbekistan “On approval of the Strategy for the transition of the Republic of Uzbekistan to a “green” economy for the period 2019-2030” No. RP-4477 dated on 04/10/2019
	Decree of the President of the Republic of Uzbekistan “On measures to radically improve the payment system for the collection and removal of solid household waste” No. DP-5580 dated on 22/11/2018
	Resolution of the President of the Republic of Uzbekistan “On approval of the strategy for the management of municipal solid waste in the Republic of Uzbekistan for the period 2019-2028” No. RP-4291 dated on 17/04/2019
	Resolution of the Cabinet of Ministers “On further improvement of the environmental impact assessment mechanism” No. 541 dated on 07/09/2020
	Resolution of the Cabinet of Ministers of the Republic of Uzbekistan “On approval of the Regulations on the procedure for developing and approving draft environmental standards” No. 14 dated on 21/01/2014
	Resolution of the Cabinet of Ministers of the Republic of Uzbekistan “On approval of regulations in the field of waste management” No. 95 dated on 06/02/2019
	Resolution of the Cabinet of Ministers “On approval of the Regulation on the procedure for exercising control in the field of waste management” No. 295 dated on 27/10/2014
	Resolution of the Cabinet of Ministers of the Republic of Uzbekistan “On approval of the Regulations on the procedure for establishing water protection zones and sanitary protection zones of water bodies on the territory of the Republic of Uzbekistan” No. 981 dated on 11/12/2019
	Rules for the reception of industrial wastewater and the procedure for calculating compensation payments for excess discharges of pollutants into urban sewer networks of cities and other settlements of the Republic of Uzbekistan (Appendix 1 to RCM No. 11 of 2010)
	Resolution of the Cabinet of Ministers “On improving the environmental monitoring system in the Republic of Uzbekistan” No. 737 dated on 05/09/2019
	SanR&N No. 0350-17 “Sanitary norms and rules for the protection of atmospheric air in populated areas of the Republic of Uzbekistan”
	SanR&N No. 0293-11 “Hygienic standards”. List of maximum permissible concentrations (MPC) of pollutants in the atmospheric air of populated areas on the territory of the Republic of Uzbekistan
	SanR&N No. 0267-09 “Sanitary norms and rules for ensuring permissible noise in the premises of residential, public buildings and on the territory of residential development”
	SanR&N No. 0088-99 Sanitary requirements for the development and approval of projects for maximum permissible discharges (MPD) of substances entering water bodies with wastewater
	SanR&N No. 0289-10 Sanitary rules and hygienic requirements for the organization of construction and construction work
	SanR&N No. 0183-05 Hygienic requirements for the quality of soil in populated areas in specific natural and climatic conditions of Uzbekistan
	SanR&N No. 0191-05 Maximum permissible concentrations (MPC) and approximate permissible concentration (APC) of exogenous harmful substances in soil

Level of regulation	Name of documents
	SanR&N No. 0212-06. Sanitary rules and norms for hygienic assessment of the degree of soil pollution of different types of land use in the specific conditions of Uzbekistan
	SanR&N No. 0318-15 Hygienic and anti-epidemic requirements for the protection of water reservoirs on the territory of the Republic of Uzbekistan
	SanR&N No. 0297-11 Sanitary rules and standards for cleaning populated areas from solid household waste in the conditions of the Republic of Uzbekistan
	SanR&N No. 0127-02 Hygienic classifier of toxic industrial waste in the conditions of the Republic of Uzbekistan
Normative-technical and instructional-methodological documents in the field of environmental protection and habitat	O'z DSt 951:2011 Sources of centralized domestic and drinking water supply. Hygienic, technical requirements and selection rules
	GOST-23941-2002 "Machine noise. Methods for determining noise characteristics"
	GOST 23337-78 "Noise. Methods for measuring noise in the residential area and in the premises of residential and public buildings"
	Instructions for conducting an inventory of pollution sources and standardizing emissions of pollutants into the atmosphere for enterprises of the Republic of Uzbekistan. Approved by the Order of the Chairman of the State Committee for Nature Protection No. 105 dated on 15/12/2005
	GOST 31295.2-2005 "Attenuation of sound during propagation on the ground"
	KMK 2.01.08-96 Protection from noise
	KMK 2.04.01-98 Internal water supply and sewerage of buildings
	KMK 2.04.03-97 Sewerage. Outdoor networks and facilities
	Temporary Recommendations on Control of Groundwater Protection in the Republic of Uzbekistan. State committee for natural resources and hydrogeology of the Republic of Uzbekistan, Tashkent, 1991
	Handbook of an environmental expert. Publication of the State Committee of the Republic of Uzbekistan for nature protection and the State environmental expertise. Tashkent, 2009

Constitution of the RUz, articles 50, 54, 55, 93, 100. Article 55 of the Constitution of the Republic of Uzbekistan determines that the Earth, its subsoil, water, flora and fauna and other natural resources are national property and are subject to rational use and protection by the state.

The Law "On sanitary and epidemiological welfare of the population" dated on August 26, 2015, establishes the main directions of state policy in the field of sanitary and epidemiological welfare of the population, defines the rights and obligations of legal entities and individuals in the field of sanitary and epidemiological welfare of the population, as well as requirements for ensuring sanitary and epidemiological welfare of the population.

The Law "On Nature Protection" dated on December 9, 1992 (as amended on 07/02/2024) establishes the legal, economic and institutional framework for environmental protection, ensures sustainable development and certain principles, including the state environmental expertise (SEE). Article 12 of the Law "On Nature Protection" determines the need for rational use of natural resources and compliance with environmental requirements".

The Law "On water and water use" of May 6, 1993 (as amended on 18/01/2024) provides for the rational use of water resources, protection of

water resources, prevention and mitigation of negative impacts and compliance with national legislation.

The Law “On the Protection of Atmospheric Air” dated on 27/12/1996 (as amended on 07/02/2024) determines the issues of preserving the natural state of atmospheric air; legal regulation of the activities of state bodies, enterprises, institutions, organizations, public associations and citizens in the field of atmospheric air protection.

The Law “On the Protection and Use of the Plant World” dated on 26/12/1997 (as amended on 01/02/2024) regulates relations in the field of protection and use of plants growing in natural conditions, as well as wild plants for the purpose of their restoration and genetic conservation.

The Law “On the Protection and Use of Wildlife” dated on 26/12/1997 (as amended on 19/09/2016) regulates relations in the field of protection and use of wild animals living in a state of natural freedom on land, in water, atmosphere and soil, permanently or temporarily inhabiting the territory of the Republic of Uzbekistan.

The Law “On Protected Natural Areas” dated on 03/12/2004 (as amended on 30/06/2022) regulates the preservation of typical, unique, valuable natural objects and complexes, the genetic fund of plants and animals, the prevention of the negative impact of human activities on nature, the study of natural processes, monitoring of the natural environment, and the improvement of environmental education and training.

The Law “On Subsoil” dated on 23/09/1994 (as amended on 13/12/2002) is aimed at ensuring sustainable and integrated use of subsoil to meet the needs for minerals, protection of subsoil, the environment, safety of subsoil use and protection of subsoil users, protection of the interests of citizens, society and the state. Regulates pollution of groundwater and soil.

The Law “On the State Land Cadastre” dated on 28/08/1998 (as amended on 30/06/2022) contains the basic rules and norms for land use and ensures rights to land. The Law establishes the ecological value of land plots and ecosystem services.

The Law “On waste” (2002) (as amended on 29/12/2023) regulates waste management and empowers the State Committee for Environmental Protection with the authority to verify, coordinate, assess the state of the environment and establish certain parameters of territories for waste disposal.

The Law “On Ecological Expertise” (2001) (as amended on 29/04/2021) provides for the mandatory examination of the impact on the environment and human health, and also serves as a legal basis for the examination.

The Law “On Environmental Control” (2013) (as amended on 07/02/2024) regulates relations in the field of environmental protection. The main tasks of environmental control are the prevention, detection and elimination of violations of legislation in the field of environmental protection; monitoring of the environmental situation and factors that can lead to environmental pollution, irrational use of natural resources, threat to the life and health of citizens.

2.1.3 Environmental Impact Assessment Process

2.1.3.1 Legal basis

The environmental assessment of strategic documents and planned activities is carried out on the basis of the following legal acts:

The national EIA procedure is regulated by:

- The Law “On Ecological Expertise” dated on 25/05/2000, amended on 29/04/2021;
- The Resolution “On Further Improvement of the Environmental Impact Assessment Mechanism” (SEE), approved by the Cabinet of Ministers No. 541 dated on 07/09/2020

The Resolution defines the legal requirements for EIA in Uzbekistan. According to the Law and the Resolution, the State Ecological Expertise (SEE) – type of environmental review carried out by specialized expert units in order to establish compliance of the planned activity with environmental requirements and definitions of the admissibility of the implementation of the object of environmental review.

The special authorized state body in the field of state environmental assessment is the Ministry of Ecology, Environmental Protection and Climate Change (hereinafter referred to as the Ministry). SEE is carried out by the following specialized expert units of the Ministry:

- “Center for State Environmental Expertise” State Unitary Enterprise of the Ministry, hereinafter referred to as the “SUE Center for State Environmental Expertise”;
- “Center for State Ecological Expertise” State Unitary Enterprises of the regions and the Tashkent city;
- “Center for State Ecological Expertise” SUE carries out state ecological expertise of EIA of economic facilities belonging to I and II categories of environmental impact (high and medium risk);
- “Center for State Environmental Expertise” State Unitary Enterprises of the Republic of Karakalpakstan and regions carry out an environmental review of the EIA of economic facilities belonging to III and IV categories of environmental impact (low risk and local impact).

2.1.3.2 EIA procedure and environmental decision

The purpose of the EIA is to identify, study and describe the direct and indirect impact of the proposed activity on human health and safety, biodiversity, water, air, soil, land, climate and landscape, cultural heritage and material values.

Environmental impact assessment materials contain three stages: PEIS, EIS and CEC.

The three stages of the EIA and their required outputs are summarized as follows:

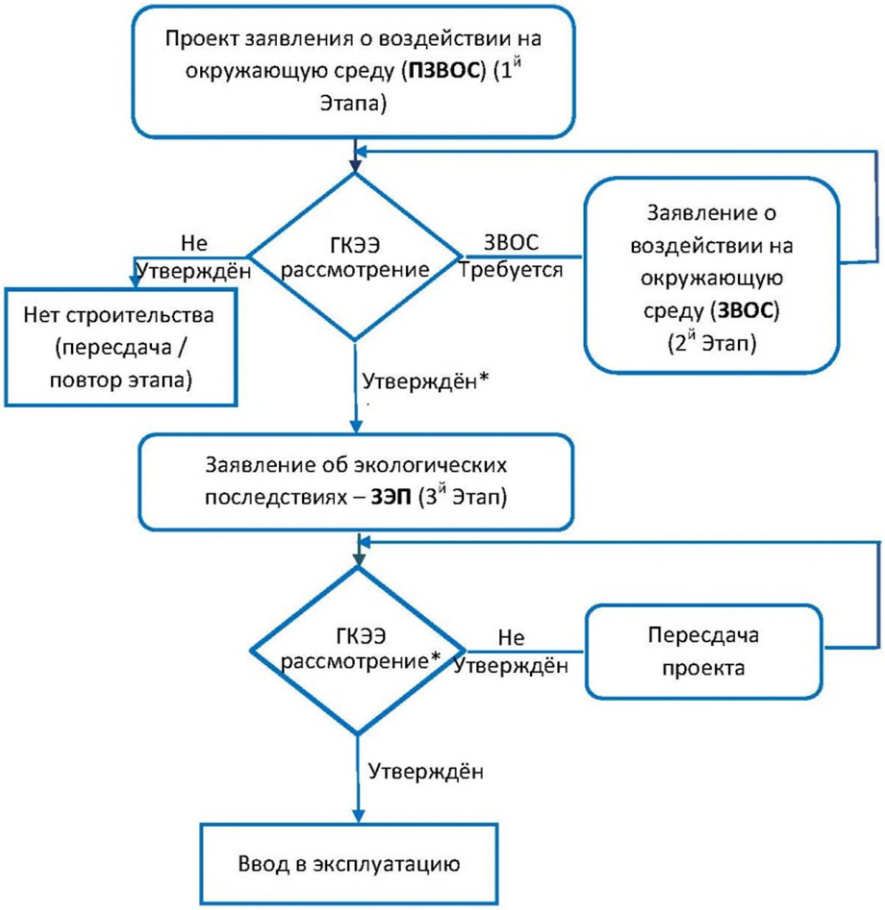
- Stage I: “Preliminary Environmental Impact Statement (“PEIS”) must be carried out at the planning stage of the proposed project prior to disbursement of funds for the development and implementation of the project.

- Stage II: “Environmental Impact Statement” (“EIS”) must be prepared within the timeframe specified in the SEE opinion obtained in Stage I in order to carry out the necessary additional studies or analyzes. The EIS must be submitted to the SEE for consideration and a positive opinion obtained before the approval of the PFS and, therefore, before the start of construction.
- Stage III: “Conclusion on Environmental Consequences” (“CEC”) is the final stage of the SEE process and must be completed prior to commissioning of the facility. The report details the changes to the project made as a result of the SEE analyze in the first two stages of the EIA process, the comments received during the public consultations, the environmental regulations applicable to the project and the environmental monitoring requirements associated with the project and the main conclusions.

The Resolution “On Further Improvement of the Environmental Impact Assessment Mechanism” approved by the Cabinet of Ministers No. 541 determines the List of activities for which the state environmental review is carried out (Appendix 1 to the RCM), describes in detail the procedure for organizing procedures for conducting SEE (Appendix 2 to the RCM) and the procedure for holding public hearings of environmental impact assessment projects (Appendix 3 to the RCM), Figure 2.1.1

All economic activities of the SEE are classified into four categories:

- Category I – “high risk of environmental impact” SEE – 20 calendar days, all stages of EIA are required (by decision of the State Expertise);
- Category II – “medium risk of environmental impact”, SEE – 15 calendar days, all stages of EIA are required (by decision of the State Expertise);
- Category III – “low risk of impact”, SEE 10 – calendar days, all stages of EIA are required (by decision of the State Expertise);
- Category IV - “local impact” - SEE is carried out on the basis of an environmental impact assessment questionnaire, filled out by the customer in electronic form through a personal account on the Ministry’s Internet resource and sent to the appropriate territorial center for state environmental assessment, review period is 5 calendar days.



* Category I – 20 days, Category II – 15 days

** PEIS/EIS approved, permits received, application for site selection received, and construction phase can begin

Figure 2.1.1 - The EIA procedure in Uzbekistan

Implementation of projects without a positive conclusion of the State Ecological Expertise entails liability under the article of the Code of the Republic of Uzbekistan on administrative liability. Also, article 193 of the Criminal Code of the Republic of Uzbekistan provides for liability for violation of norms and requirements of environmental safety.

According to Art. 21, 22 of The Law “On State Environmental Expertise”, Positive conclusion of the SEE is a mandatory document for opening financing by banking and other credit organizations and for the implementation by legal entities and individuals of the implementation of the object of state environmental expertise. The period of validity of the conclusion of the State Environmental Expertise for environmental impact assessment materials is 3 years, for draft environmental standards - 5 years.

Based on the materials of the draft EIS of the project, a positive conclusion was received from the State Environmental Expertise (Conclusion No. 01-1-101228 dated on 05/02/2024).

2.1.4 Labor relations legislation

The following national laws and regulations govern the labor relations and working conditions aspects of the project, including health and safety issues:

Table 2.1.2 - Legal and regulatory acts in the field of labor relations

Level of regulation	Name of documents
Legal and regulatory acts in the field of labor, health and safety	Labor Code of the Republic of Uzbekistan, 1996
	Law of the RUz "On state pension provision of citizens" No. 938-XII dated on 03/09/1993
	Law of the RUz "On employment of the population" No. 510-XII dated 13/01/1992
	Law "On the protection of the health of citizens", 1996
	Law of the Republic of Uzbekistan "On compulsory state social insurance against industrial accidents and occupational diseases" No. 174 dated on 10/09/2008
	Law of the Republic of Uzbekistan "On Compulsory Civil Liability Insurance of the Employer", 2009
	Law "On labor protection", 2016
	Decree of the President of the RUz "On improving the procedure for determining the amount of wages, pensions and other payments" No. 5723 dated on 21/05/2019
	Resolution of the Government of the RUz "On measures to further strengthen guarantees of labor rights and support for women's entrepreneurship" No. 4235 dated on 07/03/2019
	Resolution of the Ministry of Employment and Labor Relations of the Republic of Uzbekistan "On approval of the List of professions and jobs that adversely affect women's health, and for which it is not recommended to use the labor of women" No. 22-14-2019 k/k, No. 48 dated on 22/07/2019
	Resolution of the Cabinet of Ministers "On measures to improve the activities of the Ministry of Employment and Labor Relations of the Republic of Uzbekistan" No. 1066 dated on 31/12/2018, Appendix No. 5 to the Regulation "On the procedure for creating and organizing labor protection services in organizations"
	Resolution of the Government of the RUz "On measures to create favorable conditions for the implementation of labor activities in the territory of the Republic of Uzbekistan by qualified specialists from foreign countries" No. 4008 dated on 07/11/2018
	Resolution of the Government of the RUz "On additional measures to further improve the system of external labor migration of the Republic of Uzbekistan" No. 3839 dated on 05/07/2018
	Decree of the President of the Republic of Uzbekistan "On additional measures to create favorable conditions for certain categories of pensioners engaged in labor activity" No. 5291 dated on 28/12/2017

In the Constitution of the Republic of Uzbekistan (08/12/1992), in the chapter on economic and social rights of citizens, it is determined that every citizen has the right to:

- work, free choice of work, fair working conditions and protection against unemployment in the manner prescribed by law. Forced labor is prohibited except in the execution of a sentence by a court sentence, or in other cases provided for by law (Chapter IX, Article 37);
- rest – set out in Article 38: "Employees are entitled to paid rest. The duration of working time, paid labor leave are determined by law";
- social security in old age, in the event of disability and loss of the bread-winner as well as in some other cases specified by law (Article 39);
- qualified medical care (Article 40); Women and men have equal

  rights (Article 46).

Everyone has the right, both individually and jointly with other persons, to apply with applications, proposals and complaints to the competent state bodies, institutions or people's representatives. Applications, proposals and complaints must be considered in the manner and within the time-limits established by law (Chapter VIII, Article 35);

The Labor Code of the Republic of Uzbekistan, put into effect on 01/04/1996, considers labor legislation taking into account the interests of employees, employers and the state, fair and safe working conditions, protection of labor rights and health of employees.

The Code regulates labor relations and other relations directly related and aimed at protecting the rights and freedoms of participants in labor relations, establishing minimum guarantees of rights and freedoms in the sphere of labor.

Article 6 of the Labor Code prohibits discrimination and guarantees all citizens equal rights to work; discrimination in labor relations is prohibited. Any distinction, non-admission, preference or refusal to hire, regardless of nationality, race, gender, language, religion, political opinions, social status, education, property status, leading to a violation of equality of opportunity in the world of work is prohibited.

A person who believes that he has been discriminated against at work may apply to the court for the elimination of discrimination and compensation for the material and moral damage caused to him.

The Law "On State Pension Provision of Citizens", No. 938-XII dated on 03/09/1993 (as amended on 30/10/2021) determines the procedure for the implementation of the constitutional right of citizens of the Republic of Uzbekistan to social security in old age, in case of complete or partial disability, loss of a breadwinner, establishes a unified system of state pensions, the procedure for their appointment, calculation, recalculation and payment.

The Law of the Republic of Uzbekistan "On employment of the population" No. 510-XII dated on 13/01/1992 (as amended on 01/05/1998), defines organizational, legal and socio-economic guarantees for the realization of human rights to get a job in a market economy and equality of various forms of ownership. It is designed to create conditions that ensure employment of the population, taking into account the norms of the Constitution of the Republic of Uzbekistan and international law.

The Law "On the Protection of the Health of Citizens", 1996 (as amended on 31/05/2024) regulates the provision of guarantees of the rights of citizens to health protection by the state, the formation of a healthy lifestyle of citizens, the activities of state bodies, enterprises, institutions, organizations, public associations in the field of protecting the health of citizens.

The Law "On Compulsory State Social Insurance against Industrial Accidents and Occupational Diseases" No. 174 dated on 10/09/2008, regulates relations in the field of compulsory state social insurance against industrial accidents and occupational diseases.

The Law "On Compulsory Insurance of Employer's Civil Liability" No. 210, 2009 (as amended on 22/02/2024) regulates relations in the field of compulsory insurance of employer's civil liability.

2.1.5 Legislation on equal conditions and the prohibition of child and forced labor

The Republic of Uzbekistan has ratified 16 ILO conventions, including 8 fundamental conventions (see section 2.3), which prohibit child and forced labor and any form of labor discrimination. These key labor standards are included in the national labor legislation of Uzbekistan.

These legislative acts take into account the interests of employees, contribute to the effective functioning of the labor market, ensure fair and safe working conditions, protect labor rights and the health of employees, and contribute to increasing labor productivity, quality of work, welfare and social well-being of the population:

- Resolution of the Ministry of Employment and Labor and the Ministry of Health of the Republic of Uzbekistan "On approval of the List of professions dangerous to women's health that are not recommended for use in the employment of women" No. 22-14-02019k/k No.48 dated on 22/07/2019;
- Resolution of the President of the Republic of Uzbekistan "On measures to create favorable conditions for the implementation of labor activities in the Republic of Uzbekistan of qualified foreign specialists" No. 4008 dated on 07/11/2018;
- Resolution of the Government of the Republic of Uzbekistan "On additional measures to improve the system of external labor migration in the Republic of Uzbekistan" No. 3839 dated on 05/07/2018.

Forced labor and child labor

The Constitution of the Republic of Uzbekistan (Article 37) prohibits forced labor.

Article 7 of the Labor Code states that forced labor, i.e. forced performance of work under threat of any punishment (including as a means of labor discipline) is prohibited.

The right to work is granted to persons aged 16 and over. The law allows the employment of students of secondary general education, secondary special, vocational educational institutions as trainees to perform light work that does not harm their health and moral development, and does not interfere with the educational process, in their free time from study, provided that they reach the age of 15 and with the written consent of one of the parents or one of the persons replacing the parents (Article 77).

Under the Labor Code, persons under the age of 15 cannot work.

Young people aged 15 to 18 years have the right to work, based on local legislation, and have the same rights as adult employees, with some benefits based on their age (Article 240 of the Labor Code). Persons under the age of 18 may be employed only after passing a medical examination, and until the age of eighteen they are subject to a mandatory annual medical examination.

Persons under the age of 18 can only be employed in jobs that do not pose a danger to their health, safety and morals, and they are not allowed to lift or move heavy objects (Article 241 of the Labor Code).

Employees aged 15-16 are allowed to work no more than 24 hours per week, and employees aged 16-18 are allowed to work no more than 36 hours per week. Students can only be employed during their free time, their working hours cannot exceed half of the maximum working hours established for the respective age groups, i.e. students aged 15-16 may only work 12 hours per week, and students aged 16-18 may work no more than 17,5 hours per week (Article 242).

Articles 49 and 51 of the Administrative Code of the Republic of Uzbekistan impose fines for violation of the above norms on forced and child labor. The law as amended on 23/08/2019 significantly increases fines for the use of administrative measures to involve

employees in forced labor, which was previously practiced in the country, i.e. civil servants, mainly teachers, medical employees and students, were involved.

This law provides for fines ranging from 10 to 30 times the minimum wage for using such practices. According to the ministry, if a similar offense is repeated, the perpetrators face fines ranging from 30 to 100 times the minimum wage.

Criminal Code No. 2012-XII dated on 22/09/1994 (Articles 135, 138, 148) establishes punishment for the use of forced labor.

2.1.6 Legislation on land alienation and restoration of livelihoods

In Uzbekistan, land expropriation is provided for state and public needs in accordance with the Land Code (LC). There is no separate legal document on land acquisition and resettlement in Uzbekistan, but there is a base in the form of a number of resolutions, acts and codes described below.

Regulatory level	**Name of documents**
Normative-legal acts in the the social sphere, on the land alienation	The Civil Code of the Republic of Uzbekistan, 1996
	The Land Code of the Republic of Uzbekistan, 1998
	The Family Code of the Republic of Uzbekistan, 1998
	The Tax Code of the Republic of Uzbekistan, 2007
	The Law of the Republic of Uzbekistan "On Rent", 1991
	Decree of the President of the Republic of Uzbekistan “On measures to ensure equality and transparency in land relations, reliable protection of land rights and turning them into a market asset” No. DP-6243, 2021

Regulatory level	Name of documents
	Resolution of the Cabinet of Ministers No. 911 (16/11/2019) as amended dated 01/08/2021 “On the procedure for the seizure of land plots and the provision of compensation to owners of real estate located on the seized land plot”
	Decree of the President of the Republic of Uzbekistan “On measures to ensure equality and transparency in land relations, reliable protection of land rights and turning them into a market asset” No. DP-6243 of 08/06/2021
	Presidential Decree No. 5491 “On additional measures to ensure unconditional security of property rights of citizens and business entities”, 2019
	Decree of the President of the Republic of Uzbekistan No. 5490 “On measures to further improve the system of protection of the rights and legitimate interests of business entities”, 2018
	Presidential Decree No. 5495 “On measures to radically improve the investment climate in the Republic of Uzbekistan”, 2018
	Resolution of the Cabinet of Ministers of the RUz No. 3857 “On measures to improve the efficiency of the preparation and implementation of projects with the participation of international financial institutions and foreign government financial organizations”, 2018
	Resolution of the Cabinet of Ministers of the RUz No. 317 “On introducing changes and additions to some decisions of the government of the Republic of Uzbekistan, aimed at further improving the procedure for preparing cadastral documentation for real estate,” 2016
	Resolution of the Cabinet of Ministers No. 146 (25/05/2011) as amended on the basis of Resolution of the Cabinet of Ministers No. 1024 (20/12/2019) “On measures to improve the procedure for the provision of land plots for urban planning activities and other non-agricultural needs”
	Law of the Republic of Uzbekistan “On the seizure of land for public purposes and compensation procedure” No. LRU-781 dated on 29/06/2022

	Decree of the President of the Republic of Uzbekistan “On additional measures to improve the procedure for leasing agricultural land plots” No. 15 dated on 18/01/2024.

The Constitution of the Republic of Uzbekistan provides as follows: everyone has the right to own property (Article 36). The economy of Uzbekistan, which is developing in the direction of market relations, is based on various forms of ownership.

The state guarantees freedom of economic activity, entrepreneurship and labor, taking into account the priority of consumer rights, equality and legal protection of all forms of property (Article 53); the owner, at his own discretion, has the right to own, use and dispose of his property.

The use of any property must not harm the environment, infringe the rights and legally protected interests of citizens, legal entities and the state (Article 54); land, its mineral resources, water, fauna and flora, and other natural resources constitute national wealth and are rationally used and protected by the state (Article 55).

The Land Code of the RUz, 1998 (as amended on 17/08/2021) provides that withdrawal of a land plot or part of it for state and public needs is carried out with the consent of the land owner or in agreement with the land user and tenant - by decision of the Kengashes of people’s deputies of the regions, Tashkent city, respectively, or by decision of the Cabinet of Ministers of the Republic of Uzbekistan (Article 37, clause 2).

The seizure of land plots for state and public needs is carried out only for the following purposes:

- provision of land for the needs of defense and state security, protected natural areas, creation and functioning of free economic zones;
- fulfillment of obligations arising from international treaties of the Republic of Uzbekistan;
- discovery and development of mineral deposits;
- construction (reconstruction) of roads and railways, airports, airfields, air navigation facilities and aviation technical centers, railway transport facilities, bridges, subways, tunnels, energy system facilities and power lines, communication lines, space facilities, main pipes, engineering and communication networks;
- execution of master plans of settlements in terms of construction of facilities at the expense of the State Budget of the Republic of Uzbekistan, as well as in other cases expressly provided for by laws and decisions of the President of the Republic of Uzbekistan.

Making decisions on the seizure of land plots for state and public needs is permitted only after an open discussion with the owners of real estate located on the land plots that are planned to be withdrawn, an assessment of the benefits and costs, as well as mandatory coordination with the relevant Centralized Fund for compensation of losses to individuals and legal entities in connection with the seizure of land plots from them for state and public needs.

If the landowner, land user and tenant disagree with the decision of the Kengashes of people’s deputies of the regions and Tashkent city, respectively, or the decision of the Cabinet of Ministers of the Republic of Uzbekistan on the seizure of the land plot, this decision can be appealed in the prescribed manner.

Enterprises, institutions and organizations interested in the seizure of land plots for the construction of enterprises, buildings and structures, are required, before the start of design, to first agree with landowners, land users and tenants, as well as, respectively, with the

khokim of the district, city, region or the Cabinet of Ministers of the Republic of Uzbekistan, the location of the facility, the approximate size of the site and the conditions for its allotment, taking into account the integrated development of the territory. Financing of project work before the specified preliminary approval is not allowed.

2.1.7 Occupational Health and Safety Legislation

Legislation in the field of occupational health and safety (OHS) includes the Labor Code, the Law on Occupational Health and Safety, decrees of the President of the Republic of Uzbekistan, norms on labor protection and safety, decisions of the executive bodies of state power adopted within their competence in the form of decrees, orders, resolutions, directives, rules, etc.

More than 30 articles of the Labor Code directly relate to labor protection and safety. They include:

- Labor protection requirements (Article 211);
- Compliance with norms, rules and instructions on labor protection (Article 212);
- Conducting briefing and training of employees on labor protection (Article 215);
- Regulation of working hours in hazardous industries for employees performing special jobs and employees under 18 years of age (Articles 116, 117 and 118);
- Conditions for hiring disabled people for various jobs (Article 220);
- Providing employees with milk, therapeutic and preventive nutrition, carbonated salt water, personal protective equipment and hygiene (Article 217);
- Provision of first medical aid to employees, their transportation to medical and preventive institutions (Article 221);
- Accounting and investigation of industrial accidents (Article 222), etc.

The Law “On labor protection”, 2016 (as amended on 22/09/2016), establishes a unified procedure for the organization of labor protection, regardless of the methods of production, forms of ownership and is aimed at ensuring the protection of the health and labor of citizens.

The Law is aimed at further improving the labor protection system, strengthening the responsibility of the employer and employees for fulfilling the requirements in this area, defining the powers of state authorities to ensure proper control over labor conditions and safety, increasing the efficiency of public control in this area, bringing certain provisions of the current legislation in line with the requirements of newly adopted legislative acts in a modern market economy.

The Law introduces new concepts, clearly regulates the issues of attestation of workplaces in terms of working conditions, audit of the labor protection management system, investigation and accounting of accidents at work and occupational diseases. Also, the law establishes specific mechanisms for the participation of the public and trade unions in the implementation of public control in this area, enshrines their rights directly related to HSE.

The Law “On labor protection at hazardous production facilities”, adopted on 05/01/2018, determines the legal, economic and social conditions for ensuring the safe operation of hazardous production facilities and is aimed at preventing accidents and increasing the capacity of enterprises to eliminate their consequences.

The Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No.60 dated on 11/02/2005 introduced rules for compensation by the employer for harm caused to employees due to injury, occupational disease or other health impairment in connection with the performance of work.

In accordance with the Law “On Occupational Health and Safety”, an employee who

has become incapacitated in whole or in part due to the fault of management as a result of an industrial accident or occupational disease is entitled to a lump-sum allowance and compensation for health damage paid by the enterprise. The lump-sum allowance is determined by the collective contract (agreement) and may not be less than the annual salary of the victim.

In addition to the basic legislation, national regulatory documents regulating occupational health and safety issues are in force in the republic. These include Sanitary Rules and Norms (SanR&N), State labor protection standards (GOST, SSBT), Construction Norms and Rules (CN&R), standards for the content of harmful substances (maximum allowable concentrations and levels), normative methodological documents on certain issues that establish specific requirements for labor protection at hazardous facilities, in the manufacture or use of various products, etc.

In addition to state regulations, departmental and interdepartmental norms, requirements and rules of labor protection are applied in various industries.

According to the Regulation “On the procedure for the creation and organization of labor protection services in organizations”, Appendix No. 5 to the Resolution of the Cabinet of Ministers “On measures to improve the activities of the Ministry of Employment and Labor Relations of the Republic of Uzbekistan” No. 1066 dated on 31/12/2018, each organization must have labor protection personnel who are responsible for:

- organization of work to ensure compliance by employees with labor protection requirements;
- control over compliance by employees with laws and other regulatory legal acts on labor protection, regulatory documents in the field of technical regulation of labor protection, a collective agreement, agreements on labor protection and other local regulatory legal acts of the organization;
- organization of preventive work to prevent industrial injuries, occupational diseases and diseases caused by occupational factors, as well as work to improve working conditions;
- informing and advising the employer and employees of the organization on labor protection issues, introducing best practices and scientific developments on labor protection issues, disseminating knowledge about labor protection;
- implementation of measures to organize introductory briefing, training, retraining and advanced training of employees of the organization on labor protection issues.

If the organization employs less than 50 people, then it must have at least one occupational safety specialist or one of the managers who combine the work of an occupational safety specialist, and for organizations with more than 50 employees, it is necessary to create an internal labor protection service.

2.1.8 Occupational Health, Safety and Protection Legislation

The Law “On the protection of the health of citizens” dated on 29/08/1996 (as amended on 31/05/2024) regulates the health, safety and health of the population. The main objectives of the Law are ensuring the rights of citizens to health protection by the state; promotion of healthy lifestyles; legal regulation of the activities of state bodies, enterprises, institutions, organizations and public associations in the field of healthcare.

Air quality and noise levels in residential areas are set by the following standards:

- SanR&N No. 0293-11 “Hygienic standards”. List of maximum permissible concentrations (MPC) of pollutants in the atmospheric air of populated areas on the territory of the Republic of Uzbekistan.
- SanR&N No. 0267-09 Hygienic standards for ensuring permissible noise in the premises of residential and public buildings and on the territory of residential constructions.
- Pre-construction and construction work is regulated by SanR&N No. 0289-10 for the organization of construction production and construction work.

2.1.9 Legislation on cultural heritage

The Law of the RUz “On the protection and use of cultural heritage objects” No. 269-II (30/08/2001), with the latest amendments dated on 30/06/2022, contributes to the protection of the cultural heritage of the RUz, including tangible and intangible cultural values, by regulating legal procedures in this area.

Other main laws and regulations related to cultural heritage are:

- Law of the RUz “On the protection and use of objects of archaeological heritage” No. LRU-229 dated on 13/10/2009;
- Resolution of the Cabinet of Ministers of the RUz “On approval of normative-regulatory acts for the protection of intangible cultural heritage” No. 47 dated on 23/02/2011 (amendments are currently being made to the act);
- Resolution of the Cabinet of Ministers of the RUz “On approval of the Regulations on the procedure for the use of objects of material cultural heritage” No. 881 dated on 18/10/2019;
- Decree of the President of the RUz “On measures to further improve the public administration system in the areas of tourism, sports and cultural heritage” No. DP-6199 dated on 06/04/2020;
- Resolution of the President of the RUz “On measures to organize the activities of the Agency for cultural heritage under the Ministry of Tourism and Sports of the RUz, as well as innovative development of the sphere” No. RP-5150 dated on 19/06/2021;

The Cultural Heritage Agency coordinates the implementation of urban planning and other economic activities in territories classified as specially protected historical and cultural sites and objects of world cultural heritage, with the preservation of their historical and cultural environment, natural landscape and identity, as well as on land plots subject to economic development (if an object is located on them or a new object is identified).

According to Article 10, Law of the RUz No. 269-II “On the Protection and Use of Cultural Heritage Objects” (30/08/2001), an individual or legal entity interested in obtaining permission to carry out excavation, land management, construction, reclamation, economic and other work in the locations of objects of tangible cultural heritage and territories associated with them, work on the preservation of objects of tangible cultural heritage must conduct an archaeological study of the territory, which includes: a) historical, bibliographic and archival research; b) field and desk research.

Administrative regulations for the provision of public services for the development of architectural and planning assignments (Appendix No. 3 to the Resolution of the Cabinet of Ministers No. 370 dated on 18/05/2018) includes requirements and conditions for the protection of historical and cultural monuments, the environment, legal rights and interests of third parties when placing an object on a specific land plot, on the basis of which design documentation for the construction (reconstruction) of the object is developed.

This Regulation applies to the development and issuance of architectural and planning assignments for the design of all types of construction and reconstruction of buildings and structures, planar and linear objects, landscaping, repurposing of buildings and structures, accompanied by reconstruction, through the transfer (establishment) of the main provisions and requirements included in urban planning documentation on planning the development of territories and parts of territories (regions, settlements) of the RUz.

Review and approval of design and estimate documentation for compliance with the architectural and planning assignment is carried out by territorial architectural and urban planning councils under the Ministry of Construction of the Republic of Karakalpakstan, the main construction departments of the regions and Tashkent city — for the construction of facilities in historical zones, including in zones of protection of cultural monuments, as well as government facilities.

These bodies coordinate the design and estimate documentation within two working days after receiving positive conclusions from all other authorized bodies.

2.2 International treaties and agreements

Table 2.2.1 presents international agreements and conventions to which the Republic of Uzbekistan is a party and the requirements of which are applicable to the project.

Table 2.2.1. - List of international agreements and conventions ratified by the Republic of Uzbekistan and the requirements of which are potentially applicable to the project (as of June 2024)

International conventions and agreements	Ratification by the Republic of Uzbekistan	Entry into force in the Republic of Uzbekistan	Main objectives
Environmental protection agreements and conventions			
Paris Convention for the Protection of the World Cultural and Natural Heritage (1972)	December 22, 1995	June 15, 1996	Establishing an obligation to ensure the identification, protection, conservation, promotion and transmission to future generations of cultural and natural heritage
Bonn Convention on the Conservation of Migratory Species (1979)	May 1, 1998 (affiliation)	September 1, 1998	Global Platform for the Conservation and Sustainable Use of Migratory Animals and their Habitats
United Nations Framework Convention on Climate Change (1992)	June 20, 1993 (adoption)	March 21, 1994	Stabilization and reduction of greenhouse gas emissions
United Nations Convention on Biological Diversity (1992)	May 6, 1995 (affiliation)	October 17, 1995	Conservation of biodiversity, sustainable use of its components and equitable distribution of benefits
Agreement on the Conservation of Afro-Eurasian Migratory Waterbirds, 1995	September 1998	April 01, 2004	Conservation of migratory waterbirds, especially endangered species, as well as species with an unfavourable conservation status
Kyoto Protocol, 1997	August 20, 1999	February 16, 2005	Setting binding emission reduction targets
Paris Agreement on Climate Change (2015)	December 2015	April 2017	The Agreement, in the context of the United Nations Framework Convention on Climate Change, regulates further measures to reduce atmospheric carbon dioxide since 2020.
Agreements and conventions in the field of labor protection and social responsibility of the International Labor Organization (ILO)			
Forced Labour Convention No.29 (1930)	August 30, 1997	July 13, 1992	Abolition of the use of forced or compulsory labor in all its forms

International conventions and agreements	Ratification by the Republic of Uzbekistan	Entry into force in the Republic of Uzbekistan	Main objectives
Protocol of 2014 to the Forced Labor Convention (1930)	June 25, 2019	September 16, 2020	The main purpose of the 2014 Protocol is to put an end to forced labour, to take effective measures to prevent and end its use, to provide protection and access to adequate and effective remedies for its victims.
Freedom of Association and Protection of the Right to Organise Convention No. 87 (1948)	October 25, 2016	December 12, 2017	The right to freedom of association means not only the freedom to join existing associations, but also to create new ones. Trade unions have the right to develop without interference from outside the charter of the organization
Right to Organise and Co llective Bargaining Convention No. 98 (1949)	August 30, 1997	July 13, 1992	Protection of employees' rights to ensure that the freedom of association in the workplace is not impaired. Such protection applies in particular to acts whose purpose is: subject the hiring or retention of a employee to the condition that he does not join or leave a trade union
Equal Remuneration Convention No. 100 (1951)	August 30, 1997	July 13, 1992	"Equal remuneration for men and women for work of equal value" refers to rates of remuneration determined without discrimination based on gender
Abolition of Forced Labour Convention No. 105 (1957)	August 30, 1997	December 15, 1997	Taking all necessary measures to ensure that compulsory or forced labor does not lead to conditions analogous to slavery

International conventions and agreements	Ratification by the Republic of Uzbekistan	Entry into force in the Republic of Uzbekistan	Main objectives
Discrimination (Employment and Occupation) Conventi on No. 111 (1958)	August 30, 1997	July 13, 1992	Any distinction, exclusion or preference made on the basis of race, colour, sex, religion, political opinion, national extraction or social origin, which has the effect of nullifying or impairing equality of opportunity or treatment in employment or occupation
Convention No 138 “On Minimum Age for Admission to Employment” (1973)	April 4, 2008	March 6, 2010	The minimum age for admission to any type of employment or other work which, by its nature or the circumstances in which it is carried out, is likely to be harmful to the health, safety or morals of a young person shall not be less than eighteen years
Convention No 182 “On Prohibition and Immediate Action for the Elimination of the Worst Forms of Child Labor” (1999)	April 8, 2008	June 24, 2009	Eliminate and prevent the worst forms of child labor
Convention No 47 “On concerning the Reduction of Hours of Work to Forty a Week” (1935)	May 6, 1995	July 13, 1992	The principle of a forty-hour week applied in such a manner that the standard of living is not reduced in consequence
Holidays with Pay Convention No. 52 (1936)	May 6, 1995	July 13, 1992	Every person to whom this Convention applies shall be entitled after one year of continuous service to an annual holiday with pay
Maternity Protection Convention No. 103 (revised in 1952)	May 6, 1995	September 25, 1996	The purpose of this Convention is to protect the rights of women and children

International conventions and agreements	Ratification by the Republic of Uzbekistan	Entry into force in the Republic of Uzbekistan	Main objectives
Employment Policy Convention No. 122 (1964)	May 6, 1995	July 13, 1992	Stimulating economic growth and development, raising living standards, meeting labor needs and eliminating unemployment
Employees' Representatives Convention No. 135 (1971)	August 30, 1997	December 15, 1997	Acceptance of proposals on the protection of the rights of representatives of employees at the enterprise and the opportunities provided to them
Collective Bargaining Convention No. 154 (1981)	August 30, 1997	December 15, 1997	Facilitating negotiations which take place between an employer, a group of employers or one or more employers' organizations, on the one hand, and one or more employees' organizations
Convention No 144 "On Tripartite Consultation for the Promotion of International Labour Standards" (1976)	March 4, 2019	August 13, 2020	Ensuring effective consultations between representatives of the government, employers and employees on the activities of the International Labor Organization

Table 2.2.2 presents interstate agreements of the countries of the Central Asian region in the field of environmental protection and natural resource management, to which Uzbekistan is a party and the provisions of which are applicable to the project.

Table 2.2.2 - List of international agreements and conventions ratified by the Republic of Uzbekistan and the requirements of which are applicable to the project (as of June 2024)

Name of the agreement	Uzbekistan	Tajikistan	Kazakhstan	Kyrgyzstan	Turkmenistan
Agreement between the Governments of the CIS member states on interaction in the field of ecology and environmental protection	+	+	+	+	+

Name of the agreement	of Uzbekistan	Tajikistan	Kazakhstan	Kyrgyzstan	Turkmenistan
Agreement on cooperation in the field of joint management of the use and protection of water resources of interstate sources	+	+	+	+	+
Agreement on cooperation in the field of hydrometeorology	+	+	+	+	–

2.3 Requirements of international credit organizations

2.3.1 General overview

The most complete environmental and social requirements for investment projects are considered in the following documents of international credit organizations (hereinafter referred to as the ICO):

- "Equator Principles";[2];
- World Bank Environmental and Social Principles[3];
- Environmental and Social Policy of the European Bank for Reconstruction and Development and Requirements for the implementation of EBRD projects[4];
- Common approaches to assessing the environmental and social impact of export credits with governmental support from the Organization for Economic Cooperation and Development (OECD)[5];
- IFC's (International Finance Corporation) Performance Standards [6] and IFC's Environmental, Health and Safety Guidelines, including General Guidelines and applicable industry-specific Guidelines[7].

"Equator Principles" – ten environmental and social standards that require implementation when financing the project by the relevant financial institution and the initiator of the proposed activity:

1. Analysis and classification;
2. Environmental and social assessment;
3. Applicable environmental and social standards;
4. Social and Environmental Management System and Action Plan;
5. Interaction with stakeholders;

[2] https://equator-principles.com/about/

[3] https://projects.vsemirnyjbank.org/ru/projects-operations/environmental-and-social-framework

[4] https://www.ebrd.com/news/publications/policies/environmental-and-social-policy-esp.html

[5] https://www.oecd.org/trade/topics/export-credits/environmental-and-social-due-diligence/

[6] https://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/policies-standards/performance-standards

[7] https://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/policies-standards/ehs-guidelines/ehsguidelines

6. Grievance mechanism;
7. Independent analysis;
8. Liabilities;
9. Independent monitoring and reporting;
10. Accountability and Transparency

Selected remarks regarding the “Equator Principles”:

- Principle 1 involves determination of the category of an investment project by its potential impact according to the IFC classification (see below for more details).
- Principles 1-6 establish the requirements for the ESIA, in particular:
  - Principle 2 requires climate impact assessment and project categorization using the Task Force on Climate-related Financial Disclosures approach (hereinafter referred to as the TCFD);
  - Principle 4 requires disclosure of information about the climate impacts of proposed activities, biodiversity and potential impacts on it.

World Bank Environmental and Social Framework include:

- The concept of sustainable development, reflecting the Bank’s focus on achieving environmental and social sustainability;
- World Bank Environmental and Social Policy for investment and project financing, which establishes mandatory requirements applicable to the bank;
- Social and environmental standards, which sets out mandatory requirements imposed to the borrower and projects.

The **EBRD’s investment activities** are based on the requirements of the Bank’s Environmental and Social Policy, updated in 2019.

Projects financed by the EBRD must meet **ten requirements** (hereinafter referred to as PS) in the field of environmental and social sustainability:

- PS 1 - Assessment and Management of Environmental and Social Risks and Impacts;
- PS 2 - Labour and Working Conditions;
- PS 3 - Resource Efficiency and Pollution Prevention and Control;
- PS 4 - Health, Safety and Security;
- PS 5 - Land Acquisition, Involuntary Resettlement and Economic Displacement;
- PS 6 – Conservation of biological diversity and sustainable management of living natural resources;
- PS 7 – Indigenous peoples;
- PS 8 – Cultural Heritage;
- PS 9 – Financial Intermediaries;

- PS 10 – Disclosure of information and interaction with stakeholders.

Export Credit Agencies (hereinafter referred to as the ECA) of the **Organization for Economic Co-operation and Development** (hereinafter referred to as the OECD) member states are guided by the “OECD Council Recommendations on Common Approaches for Assessing the Environmental and Social Impacts of Government-Supported Export Credits” (2016).

The document contains the requirements to be applied by ECA for screening, classification, social and environmental assessment of projects, as well as reporting and monitoring requirements.

2.3.2 IFC requirements

The International Financial Corporation is a member of the World Bank Group, the IFC – a recognized leader in the implementation of requirements for environmental and social sustainability of investment projects.

Many years of activity of the IFC in dozens of countries around the world, the active involvement of the expert community have made it possible to form a set of effective mechanisms, including:

- The corporate policy for environmental and social sustainability;
- Performance standards and Guidelines for their application;
- General and Sectoral Environmental, Health and Safety Guidelines;
- Recommendations for assessing cumulative impacts.

Taking into account and adequate implementation of the IFC mechanisms in the planned activity ensures that the planned activity meets the high requirements in the field of environmental and social sustainability.

Probably, this fact served as the basis for choosing the requirements of the IFC in the field of environmental and social assessment for use in the ESIA project. The requirements of the IFC, which were taken into account during the implementation of the ESIA project, will be discussed in more detail below (see section 2.4).

2.3.2.1 IFC Performance standards

The activities of the IFC in the field of sustainable development are based on the Environmental and Social Sustainability Policy and the corresponding Performance Standards (hereinafter referred to as the PS):

- PS-1: Assessment and Management of Environmental and Social Risks and Impacts;
- PS-2: Labor and Working Conditions;
- PS-3: Resource Efficiency and Pollution Prevention;
- PS-4: Community Health, Safety and Security;
- PS-5: Land Acquisition and Involuntary Resettlement;
- PS-6: Biodiversity Conservation and Sustainable Natural Resource Management;
- PS-7: Indigenous Peoples;

- PS-8: Cultural Heritage.

PS-1 establishes the following requirements:

- creation of a basic policy for the implementation and preservation of the possibility of compliance with the laws and regulations provided for in the country of location of the facility, as well as to achieve the environmental and social goals of the project;
- creation of a basic policy to implement and maintain the compliance with laws and regulations set out in the facility's location, as well as to achieve the environmental and social targets of the project;
- creation of management mechanisms to eliminate/minimize risks and impacts;
- maintenance of organizational capacity and competence;
- creation of appropriate emergency preparedness and response mechanisms;
- creation of processes for continuous interaction/communication with stakeholders;
- creation of processes for monitoring and analysis of environmental and social indicators as conditions for continuous improvement of the project. PS-2 uses the provisions of international conventions under the auspices of the ILO and the UN:
- to establish, maintain and improve the employee-management relationship;
- to promote the fair treatment, non-discrimination and equal opportunity of employees;
- to ensure compliance with national labor and employment laws;
- to protect the workforce by addressing child labor and forced labor;
- to create safe and healthy working conditions;
- to protect and promote the health of employees.

PS-3 focuses on preventing or minimizing negative impacts on the environment and human habitat:

- exclusion and/or minimization of adverse impacts on humans and the environment by eliminating or minimizing pollution associated with the proposed activity;
- rational use of resources;
- reduction of greenhouse gas emissions associated with the proposed activity.

PS-4 aims to eliminate and/or minimize risks and impacts on public health, safety and security. Special requirements apply to vulnerable groups of the population.

PS-5 considers the impacts associated with land acquisition and restrictions on their use during project implementation (including involuntary resettlement issues). The standard considers both physical (resettlement) and economic displacement (loss of income sources). This standard is important when assessing decisions on the allocation of land for construction.

PS-6 is dedicated to the conservation of biological diversity, uses the requirements of the relevant international convention. It is important to the LPC project that the habitat is considered by the Standard to be modified, natural and/or critical.

PS-7 considers indigenous peoples as social groups, often belonging to marginalized and/or vulnerable segments of the population. The economic, social and legal status of indigenous peoples limits the ability to protect their rights, especially those related to land and/or nature management.

PS-8 is devoted to the issues of cultural heritage, its protection, taking into account the requirements of the Convention Concerning the Protection of the World Cultural and Natural

Heritage. This standard is important when considering decisions on construction on a designated site.

Section 2.4 in Table 2.4.1 provides an overview of IFC requirements taken into account in the ESIA.

2.3.2.2 IFC Environment, Health and Safety Guidelines

For the effective implementation of the provisions of the IFC PS, a number of methodological documents (guidelines) have been prepared to ensure the application of standards in the evaluation of planned activities.

Table 2.3.1 provides a brief overview of the IFC guidelines used in the framework of the ESIA project.

Table 2.3.1. - IFC guidelines used within the project ESIA

No.	Name	Brief description	Link
1.	General Environment, Health and Safety Guidelines (hereinafter referred to as the GESH)	Document containing examples of good international industry practice of a general nature. The Guidelines provides such levels and performance parameters that are generally considered achievable at newly commissioned facilities.	https://www.ifc.org/wps/wcm/connect/be37221a-fc47-4379-b539-eca3fe72c3e6/General%2BEHS%2B-%2BRussian%2B-%2BFinal_.pdf?MOD=AJPERES&CVID=jqeI79F
2.	Environmental, Health, and Safety Guidelines Industry sector guidelines	Comments on the implementation of the IFC PS	https://www.ifc.org/wps/wcm/connect/377bfe12-a3c0-433f-a5e3-c51dbebe38d4/SectorSpecificEHSGuidelines_Applicability.pdf?MOD=AJPERES&CVID=lakafE1

Item	Name	Brief description	Link
3.	Environmental, Health and Labor Protection Guidelines for Thermal power plants.	Document of good international practice for thermal power plants. Applicable by virtue of the sectoral affiliation of the project.	https://www.ifc.org/content/dam/ifc/doc/2000/2008-thermal-power-ehs-guidelines-ru.pdf
4.	Environmental, Health and Safety Guidelines for Water Supply and Sanitation Systems	Applicable since the project abstracts and discharges water using surface water bodies	https://www.ifc.org/wps/wcm/connect/eedfad60-8972-494c-8f95-34ec51291b5f/Water_and_Sanitation%2B-%2BRussian%2B-%2BFinal_.pdf?MOD=AJPERES&CVID=jqevNNE
5.	Environmental, Health and Safety Guidelines for Electricity Transmission and Distribution Networks	Good International Practice Document for electricity transmission and distribution networks. Applicable, since the enterprise plans to build power transmission line classified as a network distribution networks	https://www.ifc.org/wps/wcm/connect/47b11c82-bf10-42d9-a941-345eb92aa507/Electric%2BPower%2BTransmission%2B%26%2BDistribution%2B-%2BRussian%2B-%2BFinal.pdf?MOD=AJPERES&CVID=jkC-H1u
6.	Guideline to good practice “Assessment and management of cumulative impacts: a guide for the private sector in emerging markets”	The document includes a description of an approach to identifying and assessing cumulative impacts to develop and implement measures to manage cumulative effects. Applicable because the project’s ESIA includes a cumulative impact assessment	https://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/publications/publications_handbook_cumulativeimpactassessment
7.	Guidance on environmental and social assessment procedures	Methodological document revealing the requirements for environmental and social assessment procedures	https://www.ifc.org/wps/wcm/connect/6f3c3893-c196-43b4-aa16-f0b4c82c326e/ESRP_Oct2016.pdf?MOD=AJPERES&CVID=lRwoQFr

2.3.2.3 Categorization of proposed activities

Depending on the specifics of the project and the recipients, the scale and nature of potential impacts, the planned activity can be classified into one of the four categories provided for by the requirements of the IFC:

- A – activities with potentially significant environmental or social risks and/or adverse impacts – diverse, irreversible and/or unprecedented.
- B – types of activities with potentially limited environmental or social risks and/or adverse impacts – few, mainly affecting only the territory of the immediate implementation of the project and mostly reversible, the level of which can be effectively reduced with the help of mitigation measures.

- C – activities with minimal environmental or social risks and/or adverse impacts.
- FI – activities related to investments in financial institutions or using mechanisms involving financial intermediaries.

As a result of the ESIA, it was established that the project belongs to category A according to the requirements of the IFC:

- The project is potentially associated with significant negative impacts on the environment and social conditions, some of the impacts are irreversible;
- the project's area of influence includes the territories adjacent to the project;
- the implementation of the project will require the implementation of various measures to prevent and/or minimize negative environmental and social impacts.

The Consultant's experience related to the environmental assessment of such industries indicates that the impacts of the planned activities are controllable when using environmental/social management and monitoring measures.

2.4 Customer requirements

Table 2.4.1 provides an overview of the Customer's requirements contained in the Terms of Reference for the ESIA Agreement and taken into account during this stage of work.

Table 2.4.1. - Requirements contained in the Terms of Reference for the Contract for the ESIA of the project

IFC performance standard, requirements of the Terms of Reference
PS-1: Assessment and Management of Environmental and Social Risks and Impacts;
Justify the area of influence of the project, taking into account all objects and aspects/impacts
Consider greenhouse gas emissions at the operational stage.
Perform physical climate and transition risk assessments
Assess the health risks associated with the project for the local population
Assess the initial state and impacts on groundwater and soil during the construction and operation stages of the project
Consider social impacts, including evidence on the health of the population living near the project area
Conduct a risk and impact assessment of increased vehicle traffic
Consider impacts on ecosystem services (irrigation canal and Jizzakh reservoir)
Consider the risks and impacts associated with the main supply chain
Assess noise and vibration impacts during the construction and operation phase of the project

IFC performance standard, requirements of the Terms of Reference
Identify all stakeholders relevant to the project. Develop a Stakeholder Engagement Plan (SEP) consistent with IFC requirements. Conduct consultations with the affected population at the earliest opportunity. Develop a grievance mechanism for external stakeholders
Develop a procedure for monitoring the environmental and social performance of the project
PS-2: Labor and Working Conditions
Identify and assess the social risks associated with the project supply chain
PS-3: Resource Efficiency and Pollution Prevention
Identify waste management measures during the construction of the facility
Propose measures to save water resources
Conduct wastewater assessment during the construction phase of the project
Calculate direct and indirect greenhouse gas emissions from the project
Search for alternatives with lower greenhouse gas emissions
Perform an assessment of the climate impact from the project implementation (emission assessment 1, 2, 3 coverage)
PS-4: Community Health, Safety and Security
Assess the risks and impacts associated with increased vehicle traffic and the transportation of hazardous substances and materials; potential impacts on local transport infrastructure;
PS-5: Land Acquisition and Involuntary Resettlement
Risks and impacts associated with land acquisition and economic displacement in connection with the construction of the facility
Conduct a social audit to provide compensation to affected communities and individuals
PS-6: Conservation of biological diversity and sustainable management of living natural resources
Provide for a study of the initial state of biodiversity and an assessment of the impacts on biodiversity throughout the project territory, as well as at the site of wastewater discharge from project facilities
PS-8: Cultural Heritage
Consider the risks and impacts associated with the potential presence of cultural heritage assets on and near the construction site

2.5 Requirements of the Ministry of Ecology, Environmental Protection and Climate Change of the Republic of Uzbekistan

Based on the materials of the draft EIS for the project in 2024, a positive conclusion was received from the State Environmental Expertise. Conclusion No. 01-1-101228 dated on 05/02/2024 contains the following environmental conditions for the implementation of the planned activities.

1. Based on the requirements of the Appendix No.2 of the RCM RUz No. 541 dated on 11/09/2020 (Chapter 3, clause 23), after the implementation of the project under consideration, submit it for State Environmental Expertise of CEC, developed in accordance with the requirements of the RCM RUz No. 541.
2. Develop and present methods for collecting, storing and recycling waste, conclude and submit to the CEC agreements for the removal of waste generated at the enterprise;
3. Provide for the introduction of an automated control system at the priority sources of emissions of the enterprise (requirements of the Concept of the Republic of Uzbekistan on environmental protection until 2030 No. DP-5863 dated on 30/10/2019), as well as Resolution of the Cabinet of Ministers of the RUz No. 737 dated on 05/09/2019;
4. Develop and approve by the Ministry of Ecology, Environmental Protection and Climate Change of the RUz measures to create a “green belt” at the designed enterprise and landscaping of the territory of the designed enterprise;
5. Prevent the harmful effects of waste on the life and health of citizens, the environment, reduce waste generation in accordance with the requirements of Article 15 of the Law

of the Republic of Uzbekistan “On Waste” ensure the collection, proper storage and prevention of destruction and damage to waste that has resource value and is subject to disposal; do not allow storage, processing, disposal and disposal of waste in unauthorized places or facilities; exercise control over the sanitary and environmental condition of its own waste disposal facilities. According to the PCM of the Republic of Uzbekistan No. 787 dated on 02/10/2018. “On measures to further improve the efficiency of work in the field of household waste management” household waste collected at the facility should be sorted and handed over to recycling points;

3 ASSESSMENT METHODOLOGY

3.1 Justification of the methodology

Environmental and social impacts – any changes, potential or actual, in the physical, natural or cultural environment, as well as impacts on the local population and personnel caused by the planned activity [1].

In accordance with the requirements of the ESIA agreement, the project provides for the use of a methodology based on the provisions of [1, 2] and other IFC recommendations applicable to ESIA.

The ESIA procedure includes:

- determination of the composition and scope of research;
- stakeholder identification;
- disclosure of information and consultations,
- assessment of alternatives to planned activities, consideration of realistic options;
- identification and assessment of the significance of potential impacts;
- development of measures to prevent and/or minimize, compensate for impacts;
- substantiation of management and monitoring decisions;
- assessment of cumulative and residual impacts.

The ESIA provides for interaction with stakeholders, including the participation of organizations related to the planned activities.

The materials specified in Section 1.3 were used as initial data for determining the composition and scope of work.

Later in this section, methodological approaches to certain types of work as part of the ESIA are considered in more detail.

3.2 Determining the scope of the assessment

Determining the composition and scope of ESIA work is one of the main tasks of the preliminary assessment[1]. For this purpose, the following work was performed at the scoping stage:

- applicable national and other requirements for ESIA are identified. (requirements were clarified at the main stage of research and are presented in Section 2 of this report);
- analysis of documentation on the proposed activity, including the search for and justification of the use of information on analogue objects;
- reconnaissance survey of the site and the area of the proposed activity;
- collection, generalization and evaluation of available information on natural, man-made

[1] In the practice of research performed in accordance with the IFC requirements, – Scoping

and socio-economic conditions of the area of planned activity;

- identification of sensitive (vulnerable) impact recipients;
- identification of stakeholders, including the initiation of interaction with their representatives;
- preliminary determination of the impacts of the proposed activity. As a result

of the performance of these works:

- collected the necessary data that were not available at the beginning of the work on the stage;
- the zone of influence of the planned activity was preliminarily determined;
- the composition and content of the ESIA materials were determined;
- draft plan for interaction with stakeholders were developed.

Gaps in the source data were eliminated by using alternative sources of information where possible (for example, publicly available data, data from specialized organizations, data from an analogue facility were used).

As a result of further work on the study of baseline studies and at the beginning of the main stage of the ESIA, volume of initial data was formed that is necessary and sufficient to assess the impacts of the proposed activity.

3.3 Baseline Analysis

Assessment of the current situation includes fixing the initial (current) state of the components of the natural environment and socio-economic conditions in the zone of potential impact of the proposed activity in accordance with the requirements of the IFC PS-1.

This assessment was initiated at the stage of the preliminary ESIA assessment (scoping), and was continued during the main stage of the ESIA studies.

As noted above, gaps in original data have been filled by using alternative sources (collecting relevant information) and by conducting baseline studies.

An assessment of the initial state of the natural environment and socio-economic conditions in the area of potential influence of the planned activity is presented in this report (book 2, 125-1105-ESIA-P0-2, Sections 6, 7).

3.4 Identification and assessment of impacts

Identification and assessment of the significance of impacts include:

- impact forecast;
- impact assessment itself (see below for details);
- check of residual influences.

As part of the main stage of the ESIA studies, a justification was made for measures to prevent and/or minimize (compensate) negative impacts and/or their consequences.

The effectiveness of measures to prevent and/or minimize negative impacts is determined by the level of residual impacts, in terms of their acceptability for receptors or significance.

The assessment process was carried out until an acceptable level of residual impacts was reached.

3.4.1 Impact identification

The main methods used to identify the impacts on the natural and social environment of the area where the proposed activity is located:

- analysis of materials of specialized studies, results of engineering surveys, urban planning and/or other documentation of territorial planning, environmental monitoring data;
- analysis of decisions on planned activities and associated projects, taking into account the stages of the life cycle (construction, operation, decommissioning);
- stakeholder consultations;
- identification of impacts as a result of the analysis of the chain “source – path – receiver”.[2]

In the future, when assessing the significance of impacts, important attention is paid to identifying recipients, as well as determining their sensitivity to potential impacts (see 3.4.4).

3.4.2 Life cycle stages

With regard to the components of the environment and socio-economic conditions, potential impacts and their significance are determined for each of the life cycle stages of the proposed activity.

ESIA considers the following stages of the life cycle:

- construction;
- exploitation.

Decommissioning of the facility is not considered, since the continued demand for power plant products (electricity) is assumed for a conditionally unlimited period, forecasting impacts beyond which becomes impractical due to the high uncertainty of the results.

Given the lack of information on the facilities associated with the project (power lines, gas pipelines and water supply), forecasts and impact assessments for the construction and operation phase of these facilities are not carried out.

3.4.3 Characteristics of impacts

The impacts of the proposed activity are classified based on their characteristics, which ultimately determine the ability to manage and control. Table 3.4.1 provides the impact characteristics adopted for the purposes of this ESIA.

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[2] In accordance with the requirements of the ESIA assignment.

Table 3.4.1. - Characteristics of impacts

Indicator	Definition	Characteristic
Orientation	Positive	Impacts associated with positive changes (consequences) for recipients
	Negative	Impacts associated with negative changes (consequences) for recipients
Genesis	Direct	Impacts related to the direct interaction between the proposed activity and recipients
	Indirect	Impacts not related to the direct interaction between the proposed activity and recipients
Mechanism	Cumulative	Impacts of the proposed activity, the significance or consequences of which for recipients may increase as a result of impacts that are not related to the proposed activity, but are characteristic of the territory and/or receptors under consideration

3.4.4 Impact Significance Assessment

The ESIA uses a traditional methodological approach to assessment, which makes it possible to characterize the potential impacts of the proposed activity according to several indicators (Table 3.4.2):

- distribution (scale);
- duration;
- reversibility.

Table 3.4.2. - Impact assessment indicators

Indicators	Significance	Characteristics
Distribution (scale)	Local	The impact is localized within the boundaries of the facility site, sanitary protection zone, and/or part of the area of the planned activity in the immediate vicinity of the facility (part of the drainage basin)
	Domestic	The impact is localized within the area of the proposed activity (administrative district, municipality) or the catchment area of a large watercourse
	Regional	The impact is localized within several areas or catchment areas of large watercourses
	Transborder	Impact affecting recipients beyond state borders
Duration	Short-term	Impacts associated with short-term or irregular events only
	Medium-term	Impacts are strictly limited to the stages of construction, operation, there are no residual impacts
	Long-term	The impacts are typical for the stages of construction, operation, there are residual impacts
Reversibility	Reversible	Restoration of the original state of the recipient either as a result of taking corrective/compensatory measures and (or) self-recovery
	Irreversible	Impacts that cause permanent changes in the recipient

Table 3.4.3. The magnitude of the impact

Impact	Criteria
Insignificant	The impact does not affect the recipient's indicators, their values are comparable to background levels, the functions and processes inherent in the recipient are not violated, the changes are within the limits of natural variability
Small	Changes that can be captured by generally applicable monitoring methods without affecting significant ecosystem or community functions Distribution: local or domestic Duration: short-term, medium-term or long-term Reversibility: reversible
Medium	Impacts that may lead to changes in ecosystems or in the way and quality of life of communities, but without their transformation, loss (total or partial) of their natural functions Distribution: domestic or regional Duration: medium-term or long-term Reversibility: reversible or irreversible
High	Impacts related to the transformation of ecosystems and/or the loss of their functions, the transformation of the quality of life of communities Distribution: regional Duration: medium-term or long-term Reversibility: reversible or irreversible

The significance of an impact is determined by its magnitude and the sensitivity of the recipient. In turn, sensitivity to impacts depends on the resistance of the recipient to changes (the ability to restore and/or maintain significant functions) and the value/uniqueness of the recipients, the characteristics of the impacts are presented, allowing to assess their significance (Table 3.4.4).

Table 3.4.4. - Recipient sensitivity

Significance of the recipient	Sustainability of the recipient	
	Sustainable	Unsustainable
Insignificant	Minor	Low
Significant	Medium	High

Table 3.4.5 presents the characteristics of the impacts, which make it possible to assess their significance.

Table 3.4.5. - Impact significance assessment matrix

Magnitude (degree) of impact	Recipient sensitivity			
	Minor	Low	Medium	High
Insignificant	Negligible	Negligible	Negligible	Negligible/low
Small	Negligible	Low	Low / Moderate	Moderate
Medium	Negligible	Low / Moderate	Moderate	High
High	Low	Moderate	High	High

Impact significance assessment is also carried out taking into account the implementation of measures to prevent and/or minimize negative impacts and/or their consequences.

At the final stage of the assessment, using this algorithm, an assessment of the residual impacts is performed, taking into account measures to prevent and/or minimize negative impacts and/or their consequences and/or compensatory measures.

3.5 Recommendations

Impact significance assessment provides the basis for developing measures to prevent/mitigate impacts, control and monitor the effectiveness of their implementation.

Justification of measures is carried out in accordance with the hierarchy recommended by the IFC PS-1:

- impact prevention;
- impact minimization;
- restoration of affected components/ecosystems/communities – if applicable;
- compensation to affected components/ecosystems/communities – if applicable;
- “offset” (improvement)[3] – if applicable.

In the ESIA, special attention should be paid to impacts whose significance is assessed as “High”. However, the Consultant and the initiator of the planned activity have considered measures for other impacts.

3.6 Cumulative impacts

Cumulative impacts are impacts generally recognized as significant based on scientific opinion and/or based on the concerns of the affected communities.

The requirements and approaches to assessing cumulative impacts are set out in a number of IFC documents:

- PS-1 [1];
- Manual [2], Basic requirements P37-P43:

.

[3] As a rule, in relation to measures for the conservation of biodiversity.

- P37. The diverse environmental and social impacts of existing projects, combined with the potential for additional impacts from proposed and/or anticipated future projects, may result in cumulative impacts.
- P38. If a project includes specific physical elements, aspects and objects that can cause impacts, the process of identifying risks and impacts must include an assessment of the cumulative impacts of several project-related components. In situations where several projects are carried out or planned in the same region, it is advisable to conduct a cumulative impact assessment (hereinafter referred to as CIA).
- P39. Cumulative impacts are those that arise as a result of additional project impacts added to other existing, planned and reasonably predictable future projects and events.
- P40. An important element of the CIA is to determine the size of the area around the project to be evaluated, the appropriate time period, and approaches to assessing complex interactions between different projects occurring at different times. CIA process is, in principle, similar to environmental and social impact assessment, and therefore its implementation is based on the accepted methodology.
- P41. In accordance with clause 8 of Performance Standard 1, in the case of financing projects that include various physical elements, aspects and objects capable of causing impacts, it is required that, as part of the ongoing environmental and social impact assessment, the cumulative impacts from the further development of the project and other related events are identified and assessed, the impacts of which may be enhanced as a result of the implementation of the planned activities. CIA should be proportionate to the additional contributions, sources, extent and severity of cumulative impacts and limited to only those impacts determined to be important based on the scientific interests and/or concerns of affected communities. Potential impacts occurring without or independently of the project should not be considered.
- P42. The environmental and social assessment should identify situations associated with existing projects that may be exacerbated by the funded project, which could result in cumulative impacts. Priority should be given to assessing the cumulative impacts of the project being considered for funding, such as future planned events associated with the project and other future similar events in the project's area of influence that are realistically identified at the time of assessment.
- P43. Where necessary, the customer shall take economically feasible steps to involve relevant government agencies, other developers, affected communities and, as appropriate, other interested parties in the assessment, development and implementation of coordinated mitigation measures to manage potential cumulative impacts resulting from the implementation of multiple projects in the area of influence of the same project.

- The Guideline “Assessment and management of cumulative impacts: a guide for the private sector in emerging markets” [3].

To assess cumulative impacts, the Accelerated Assessment of Cumulative Impacts (hereinafter referred to as ACIA) methodology, discussed in [3], is used.

When assessing cumulative impacts, it is required:

- forecast of the joint (cumulative) impact of the planned activity, other types of activities/projects, natural conditions with an assessment of the sustainability of valuable environmental and social components (VESC);
- justification of measures that exclude significant risks to the functioning of the VESC.

ACIA provides for [3]:

- determination of the scope of work, stage 1 – identification of the VESC, justification of the spatial and temporal framework;
- determination of the scope of work, stage 2 – other activities and significant environmental factors;
- determination of the background state of the VESC;
- assessment of cumulative impacts on VESC;
- assessment of the significance of cumulative impacts;
- preparation of management decisions regarding cumulative impacts.

It should be noted that the cumulative impact assessment was carried out at a qualitative level, but this forecast is based on measurable impact indicators and/or environmental characteristics determined from data from special studies.

As the VESC, the ESIA examines the receptors whose consideration is important for assessing the consequences arising from cumulative impacts.

Impacts on the natural and social environment characteristic of the area of the planned activity are considered taking into account their significance, that is, the assessment is carried out for recipients in relation to whom the project is assessed as a source of significant impacts.

The spatial scope of the work includes territories where activities have an impact on the MESC simultaneously with the impacts of the planned activity.

PS-1 of the IFC requires consideration of ongoing or planned activities that are not directly related to the project, which are being implemented, planned or can be reasonably predicted.

According to the recommendations of the ACIA, it is advisable to use the stages of the project life cycle as a time frame.

Further clarification of the scope of the assessment is aimed at identifying past, current and planned activities and/or environmental parameters that are characteristic of the territory under consideration and potentially associated with impacts on the VESC.

Data on the state of the natural and social environment in the area of the planned activity are based on baseline studies materials and information obtained from open sources and/or provided by authorized bodies.

The actual assessment of cumulative impacts includes:

- definition of VESC, characteristics of their stability in relation to the considered impacts;
- definition of “external” activities, including the state (factors) of the environment that potentially have an impact on the VESC.

To assess the significance of impacts, the methodological approach outlined above was used (see. Section 3.4).

The preparation of management decisions regarding cumulative impacts is based on the hierarchy of measures presented in Section 3.5 (prevention,
– minimization - restoration - compensation).

As a rule, the assessment of cumulative impacts does not require the development of specific (“unique”) measures to prevent and/or mitigate them. However, the Consultant did not exclude the need to consider additional measures that require discussion with stakeholders (representatives of business, local administrations, authorized bodies in the field of environmental protection).

3.7 Presentation of results

The results of the impact assessment are presented in accordance with the matrix layout given in Table 3.7.1.

The matrix is completed for each recipient and for each stage of the life cycle of the proposed activity. The matrix consists of two parts – the first part contains an assessment of the sensitivity of the recipient, the second part – the actual characteristics of the impact.

Impact assessment a priori assumes that the recommended measures for and/or prevention of negative impacts, as well as compensatory measures (if developed) will be implemented.

The last row of the matrix presents the characteristics of the residual impacts, – i.e. provides an assessment of the impacts predicted after the implementation of all activities recommended in this study.

Sources

1. Performance standards for environmental and social sustainability. IFC, 2012
2. International Finance Corporation Guidelines: Environmental and Social Sustainability Performance Standards. IFC, 2012
3. Good Practice Guide “Assessment and Management of cumulative impacts: a guide for the private sector in emerging markets”. IFC, 2013

Table 3.7.1 - Matrix of impact assessment results (filled in by life cycle stages)

Life cycle stage: specify Recipient:

specify

Part 1. Sensitivity of the recipient: give the name (multiple recipients are allowed)

Significance	**Sustainability**	
	Sustainable	Unsustainable
Insignificant	Minor	Low
Significant	Medium	High

Part 2. Impact Characteristics (provided for each receptor, if applicable)

Impact	The name is given		**Orientation**	**Genesis**	**Mechanism**
			Positive/ Negative	Direct/Indirect	Cumulative (mark is made)
Primary impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local Domestic Regional	Short-term Medium-term Long-term	Reversible Irreversible	Insignificant Small Medium High	Negligible Low Moderate High
Consequences	• … • …				
Measures	• … • …				
Residual impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local Domestic Regional	Short-term Medium-term Long-term	Reversible Irreversible	Insignificant Small Medium High	Negligible Low Moderate High

4 CHARACTERISTICS OF THE PLANNED ACTIVITY

4.1 General information

4.2.1 Location of the object.

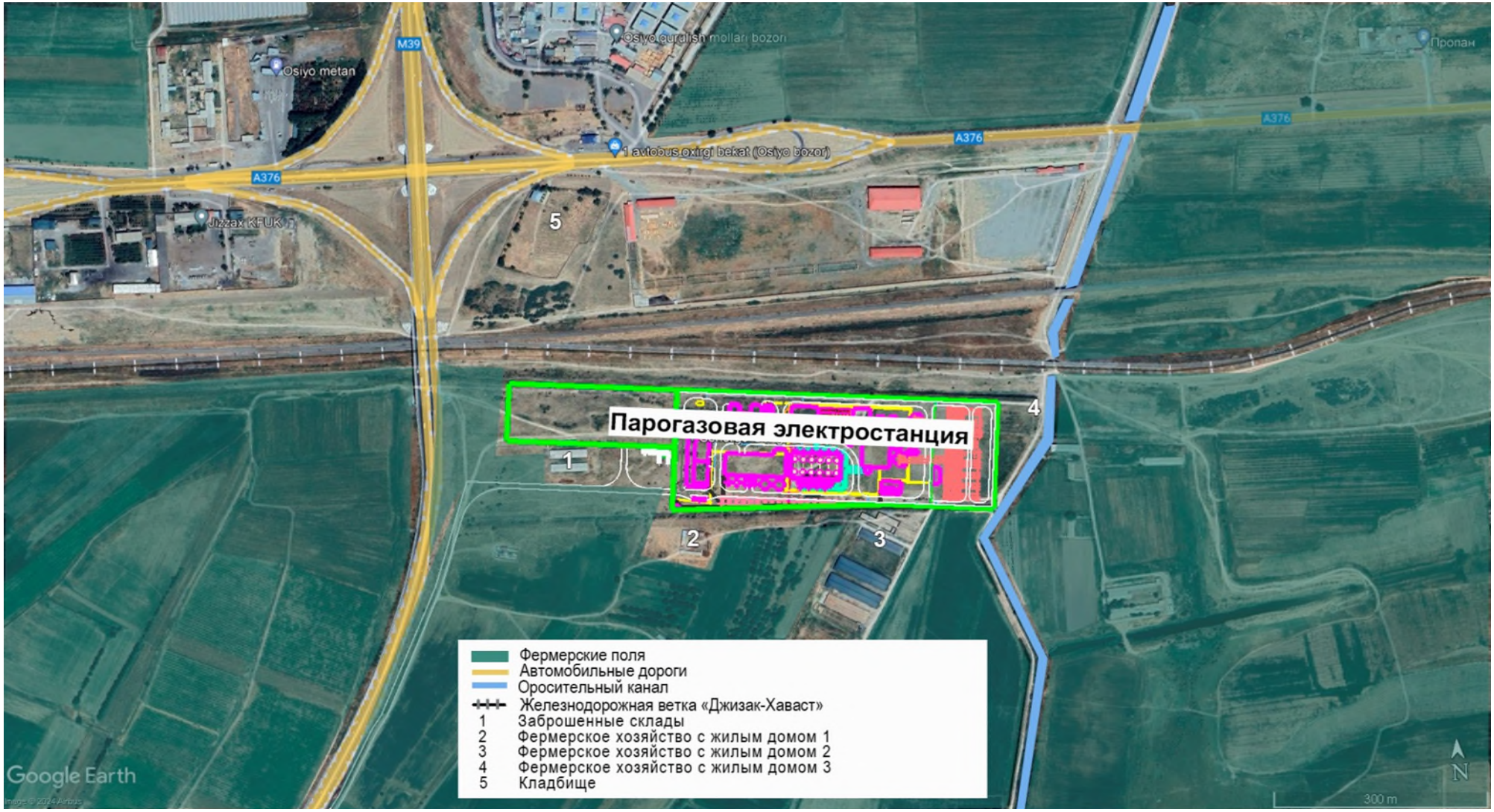
Administratively, the planned combined cycle gas turbine power plant will be located in Sharaf-Rashidov district of Jizzakh region. The distance from the allocated territory to the border of Jizzakh, which is located in a westerly direction, is 5.5 km. The territory of the allocated construction site is surrounded on all sides by empty agricultural fields. Figure 4.1.1 shows the location of the construction site.

The nearest highways run in a northerly direction at a distance of 325 meters (A 376) and in a westward direction at a distance of 95 meters (M 39) from the designated site for the construction of a power plant.

The “Jizzakh-Khawast” railway line runs in a northerly direction at a distance of 60 meters from the site under consideration.

The nearest surface watercourse to the designated construction site is an irrigation canal, which flows at a distance of 11.5 meters in an easterly direction with a capacity of 20 to 25 cubic meters of water per second and a total depth of up to 4 meters along the edge of the normal water level.

Figure 4.1.1. - Industrial site and adjacent facilities



4.2 Project activities

4.2.2 Technological solutions and personnel

On the allocated territory it is planned to install a gas turbine unit (GTU) “Siemens SGT5-4000F V10”, with a power of 365.3 MW (50 Hz), manufactured in Germany (1 unit). Also, at the planned power plant, electrical energy will be generated using a steam turbine (ST) “Siemens SST-700/900”, with a capacity of 185.3 MW, manufactured in Germany (1 unit) (Table 9).

The total production of electrical energy at the power plant will be 4 000 000 MWh per year. The operating mode of the new combined cycle power plant is basic, year-round, round the clock with the maximum possible number of hours of use of production capacity.

Modern and innovative technologies used at the new power plant will have high efficiency, which is twice as high as those of existing, traditional thermal power plants. This, in turn, will generate twice as much electricity with the same consumption of natural gas.

It should be noted that in standard gas turbine installations for the production of electricity, the efficiency is 35-40%. In the proposed combined cycle with the use of combined cycle gas plants, the efficiency will be in the range of 55-60%. The construction time of a combined-cycle gas power plant is much shorter than the construction time of traditional thermal power plants of other types. At the same time, the transition to a combined-cycle gas cycle makes it possible to improve the environmental performance of the plant and significantly reduce the level of harmful emissions into the atmosphere.

The total electrical efficiency of the proposed CCGT is 61%. The CCGT in question belongs to a relatively new type of power plant powered by natural gas. Combined-cycle gas units are designed to produce the maximum amount of electricity (primary and secondary from hot exhaust gases).

Table 1 Main technical characteristics of a combined-cycle gas power plant

Characteristic	**Description/value**
Type of technology	Combined cycle gas turbine technology
The total area of the allocated plot for construction is	9.43 ha.
Number of combined cycle gas turbine plants (CCGT)	1 unit, capacity 356.3 MW
Type of CCGT	Gas Turbine (GT) series: “Siemens SGT5-4000F V10” – 1 unit. (manufacturer Germany)
Number of steam turbines (ST)	1 unit, capacity 193.7 MW
Type of steam turbine	Steam turbines (ST) of “Siemens SST-700/900” (manufacturer Germany) series.
CCGT ECE	61%
Power generation	550 MW
Number of working hours per year	7800 hours/year
Fuel	Natural gas
Annual consumption of natural gas	748 800.0 thousand m3/year
Consumption of conventional fuel for electricity generation	1230 g.t/kWh
Type of condenser cooling	Water-cooled

Type of cooling tower	Cooling towers with artificial ventilation
Number of chimneys	2 units
The height of two chimneys of the CCGT	60 meters
Diameter of the chimney mouth	The bypass pipe is 7.0 meters and the boiler pipe of the heat exchanger is 7.2 meters

GTU - SGT5-4000F model with a capacity of 365.3 MW (50 Hz) is a powerful, reliable, energy–efficient gas turbine showing excellent performance in a simple cycle – 365.3 MW and high efficiency in a combined cycle – 62%.

The ease of maintenance of the modular design leads to short downtime, ensuring that the GTU reaches maximum operational readiness in a short time.

Innovative internal cooling air channels ensure reliable long-term operation and the ability to start quickly. Changing the design of the hydraulic gap (HCO) reduces losses in the gap, which increases the efficiency of the GTU, minimizes wear, mechanical, vibration, and temperature loads during start and stop.

The main structural components of SGT5-4000F:

- 15-stage axial compressor;
- annular combustion system;
- 4-stage air-cooled turbine.

The rotor with self–centering, leveling discs, with Hirth notches, central thrust is a guarantee of simple and fast assembly, maintenance, repair, balancing and replacement of parts on site. The upgraded internal channels for the cooling air flow reduce the load on the main structural components of the GTU, ensure a long period of maintenance-free operation

Variable angle guide vanes plus two stages of high-speed variable pitch guide vanes (VGV) increase partial load efficiency and optimize performance over a wide range of operating conditions.

Built-in valves provide a controlled supply of cooling air.

Technical characteristics of GTU:

- Full capacity 329 — 385 MW
- fuel – natural gas, LNG, acid gases, distillate oil, H, biodiesel, kerosene, jet fuel, condensate, oil;
- 50 Hz
- efficiency – 41% — 41.5%;
- heat consumption – 8780 — 8675 kJ/kWh;
- turbine speed – 3000 rpm;
- pressure ratio 20.1 to 1, 21.0 to 1
- exhaust gas consumption – 724 – 800 kg/s;
- exhaust temperature – 599 — 619°C;

Specific emissions of pollutants:

- No_x ≤ 25 ppm at 15% on liquid fuel (with water injection for NO_x control);
- CO ≤ 80 ppm;

- Formaldehyde – N/A

Siemens has improved the SGT5-4000F, providing higher component efficiency due to better aerodynamics of the compressor and turbine, as well as higher gas turbine performance.

With its high steam capacity, the SGT5-4000F is excellent for cogeneration or combined heat and power generation (CHP), for example, for:

- desalination of seawater;
- technological steam;
- district heating.

Siemens SST-700 steam turbine 185.3 MW

The steam turbine model “SST-700” is an energy efficient and standard solution for a turbine with a short delivery time due to a fixed predesigned structure.

The “SST-700” model steam turbine provides a short period of power generation, cost-effective supply of materials and fast delivery from the factory.

A ramjet turbine with a capacity of 185.30 MW consists of a high-pressure steam turbine (backpressure), which drive a generator installed between them.

The steam turbine with an internal casing is a competitive and optimized product for combined cycle power plants.

Technical parameters:

- rotation speed from 3,000 to 3,600 rpm;
- inlet pressure up to 180 bar / up to 2,611 psi;
- inlet temperature: up to 585 °C / up to 1,085 ° F;
- exhaust steam parameters: up to 0.3 bar / 4.4 psi;
- superheated steam temperature: 565 °C / 1,050 °F;
- superheated steam pressure: 45 bar (A) / 842 psi;
- controlled extraction: 72 bar / 1,044 lb/sq. an inch.

The principle of CCGT operation.

The air compressed in the CCGT compressor continuously enters the combustion chamber, where it promotes the combustion of gaseous fuel at constant pressure. The combustion products enter the gas turbine, where the kinetic energy of the gas flow is converted into the mechanical work of rotating the turbine rotor, where electrical energy is obtained. The temperature of the gases in front of the gas turbine, depending on the turbine series, is in the range of 1100-1500°C.

After the CCGT, the exhaust gases at a temperature of 670°C enter a waste steam generator (waste heat boiler), in which steam is formed by transferring the thermal energy of gases from the gas turbine to feed water and steam. Gases from the recovery boiler are released into the atmosphere through the chimney at a temperature of about 85-140°C.

The steam generated in the recovery boilers enters the steam turbine, where the kinetic energy of the steam drives the turbine, generating secondary mechanical energy, and accordingly additional electrical energy is obtained.

The combined cycle gas plant consists of two separate units: steam power and gas turbine. In combined-cycle gas installations, the first generator is located on the same shaft with a gas turbine, which generates an electric current due to the

rotation of the rotor. Passing through a gas turbine, the combustion products give it only a part of their energy and still have a high temperature at the outlet of the turbine. Further, the combustion products enter the steam power plant, into the heat recovery boiler, where water vapor is heated. The temperature of the combustion products is sufficient to bring the steam to the state necessary to rotate the steam turbine and obtain additional electrical energy.

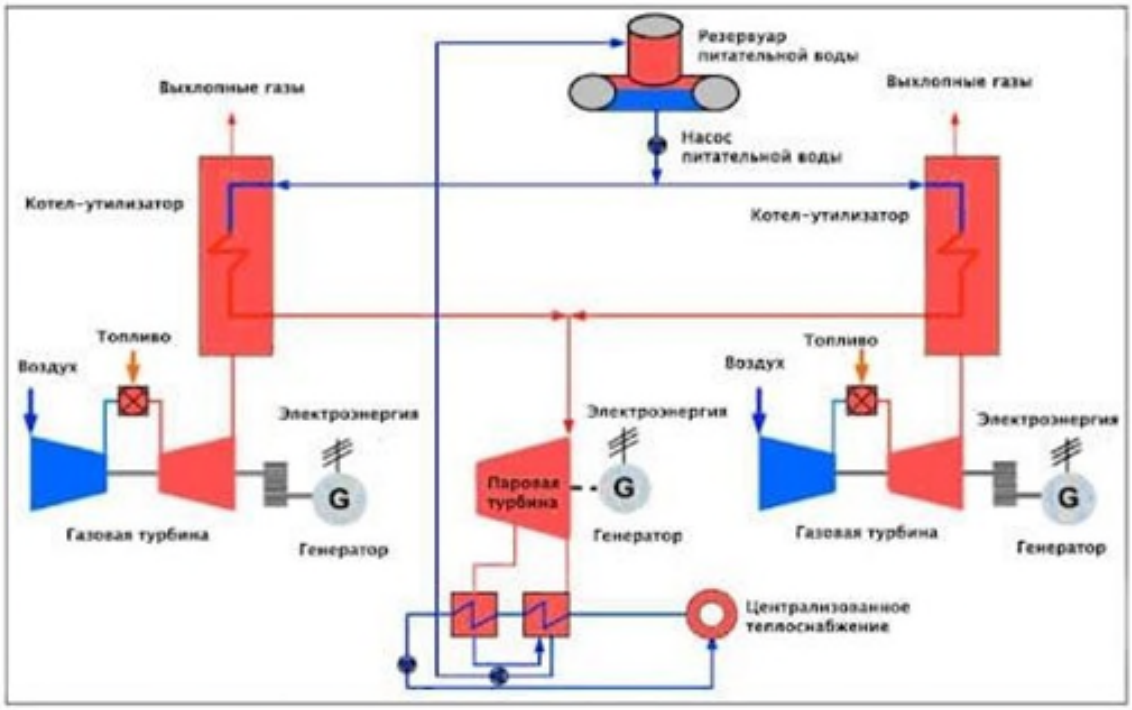


Figure 1 Cycle of electric energy production

It is planned to have production units on the territory of the power plant, where electricity will be directly generated, as well as auxiliary units.

Table 2 Composition of production and support units

Item	Name
1.	**Water intake facilities**
1.1	Water intake area
1.2	Pumping station
2.	**Chemical water treatment site (ChWT)**
2.1	The building of the water treatment plant
2.2	Sewage sump
2.3	Chemical dosing building
2.4	Containers with raw water.
2.5	Containers with demineralized water
2,6	Cooling tower
2.7	Condenser for cooling water
2.8	The fire station building
3.	**Gas turbine plant**
3.1	Gas turbine
3.2	Waste heat boiler
4.	**Steam turbine plant**

4.1	Steam turbine
4.2	Water-cooling condensers
5.	**Compressor station**
5.1	The building of the gas compressor station
5.2	The building of the gas measurement station
6.	**Transformer section**
6.1	Transformers
6.2	High voltage distribution area
7.	**Support units**
7.1	Administrative building
7.2	Repair and mechanical workshop
7.3	Warehouse building
7.4	Parking place for cars
7.5	Dining room
7.6	Laboratory
7.7	Diesel generator set
7.8	Checkpoint.

During the construction of the power plant, about 650 builders will work on the territory of the construction site, 600 of them are employees, 50 are engineering and technical personnel.

70 employees are expected to be involved in the operation of a combined cycle steam and gas power plant, of which: 5 people are engineering and technical personnel; 65 people are production and operational personnel, employees and employees.

4.2.3 Land use

The construction of the facility is envisaged on a plot of agricultural land allocated by the khokimiyat of Sharaf Rashidov district.

The total area of the allocated plot for the construction of the combined cycle gas turbine power plant is 94,305.25 m2 or 9.43 ha, including: for the construction of the station 29,120.00 m2 or 2,912 ha; for hard surfaces (parking, roads and others) 28,630.25 m2 or 2,863 ha; for green spaces 28,630.25 m2 or 2,863 ha.

4.2.4 Water supply

The water supply of the planned power plant during operation consists of production and household and drinking needs.

The power plant’s water supply sources are:

- drainage channel of the Jizzakh reservoir - for industrial water supply (Figure 2);
- centralized district water supply for household and drinking needs.

Water consumption for the production needs of a power plant consists of water consumption:

- to recharge the steam-water cycle and the circulating cooling system;

- to purge cooling towers;
- on the need for additional water of the ChWT system.

Figure 2 Drainage channel of Jizzakh reservoir

A closed, circulating cooling system is used to cool the CCGT equipment. A mixture of demineralized water and ethylene glycol is used as a cooling medium in a closed circuit.

The heated water of a closed circuit is cooled by water from an auxiliary (external) circuit, which includes wet fan cooling towers with an internal pool, pumping stations, an inhibitor dosing system and monitoring devices. The water bowl of the cooling tower is filled with clarified water supplied by pumps from the tanks of the industrial water supply.

The additional water consumption consists of the losses of the settling tanks, the circulating cooling system (evaporation and entrainment of drip liquid in cooling towers), the water consumption for purging cooling towers, as well as the intake of additional water into the ChWT system.

The primary purified water is sent to the raw water reservoir, from where the water flow is further distributed to the needs of the cooling tower, to recharge the cooling tower, to demineralize and cool the systems.

The circulating water cooled at the cooling towers is supplied via circulation pumps to the condensers of the steam turbine and to all auxiliary equipment through circulation ducts. After condensers and other heat exchangers, the spent (heated) water is sent to cooling towers for cooling by circulating water ducts.

Replenishment of losses in the circulation system (evaporation and entrainment of water in cooling towers, purging of the circulation system) is provided by supplying additional water from the raw water tank.

In order to avoid the formation of salt deposits on the walls of the equipment, constant purging of cooling towers is provided. Purge waters are conditionally pure. The water after purging, being conditionally clean, is planned to be discharged through the water pipes into the irrigation canal (Figure 3).

Figure 3 Irrigation canal next to the project area

According to the data provided by the investor, the production water consumption is formed conditionally based on the calculation of electricity generation per 1 MW of about 0.36 m3 of water.

The approximate water consumption is calculated taking into account the water consumption per 1 MW - about 0.36 m3 (water intake for the chemical water treatment system, recharge of the raw water tank, fire system and others).

With the production capacity of the power plant - 550 MW/h, the hourly water consumption will be: 550.0 x 0.36 = 200.0 m3/hour, 4800 m3/day.

The power plant will use a circulating water supply system with the installation of a fan-mounted cooling tower of the “CENK” type (3 fans in each tower). The cooling range of the cooling towers will be 10 C, the inlet water temperature is 34 C, the outlet water temperature is 24 C, the drip loss is 0.20% and the evaporation of water will be 1.30%.

After filling the system with a technological volume of water, then there is a periodic replenishment of water losses in the technological cycle. Replenishment of losses in the circulation system (evaporation and entrainment of water in cooling towers, purging of the circulation system) is provided by supplying additional water from the raw water tank.

The cooling water from the cooling tower will be used mainly in the condenser to condense the exhaust steam. The oil block also uses cooling water to cool the lubricating oil.

4.2.5 Water disposal

According to the technology, in order to avoid the formation of salt deposits on the walls of the equipment, the cooling towers are constantly purged. Purge waters

are conditionally pure. The total salt content in this water does not exceed the salt content in the source water. It is planned to monitor the salinity in the source and purge waters. The purge water of the cooling tower and the water after cooling of the equipment are diverted to the internal sewer network of the enterprise and then it is planned to be sent to the irrigation canal.

An oil-containing water collection and purification system is provided on the territory of the 550 MW power plant, which is an integral part of the power plant operating on gas turbine installations. The system is designed to collect water from areas that may be contaminated with oil, for its subsequent purification.

The oily wastewater will be separated from the oil using an oil separator. The separated oil will be transferred to a specialized organization for processing, and the purified water from the oil separator will be sent back to the tower of the cooling tower.

In case of emergency discharges of wastewater contaminated with petroleum products, it is necessary to ensure their safe removal and transfer of contaminated water to the nearest treatment facilities.

It should be noted that when using the innovative “Dry Flexicycle” technology in the steam cycle of a dry condenser connected to the radiator cooling circuit, the total water consumption of the power plant drops to such a low level that it can be used in the most arid and arid regions. “Dry Flexicycle” is the optimal solution for power plants operating on a flexible base load (both with gas and multi-fuel configurations).

Household waste water will be discharged into waterproofing cesspools with a volume of 60 m3 each, followed by export to the nearest treatment facilities on the basis of an economic agreement with specialized enterprises.

Rainwater from the territory and from the roofs is provided to be collected by a system of trays with further use for irrigation, and then it is discharged by irrigation ditches into the irrigation network of the district.

Household wastewater (excluding water for irrigation of the territory, greenery and 40% of water, which relate to irretrievable losses during floor cleaning) will amount to 17,993 m3/day. or 6277.67 m3/year.

Then, the total volume of production and household effluents at the power plant will amount to 1,651,993 m3/day. or 578401.7 m3/year.

4.2.6 Heat and power supply

Heat supply to the facility will be provided by an autonomous boiler house with an installed boiler with a capacity of 22 MW with a total gas consumption of 800,000 Nm³/h per year.

Electricity supply will be provided by self-generated electricity.

4.2.7 Provision of material resources

The supply of natural gas to the combustion chambers of gas turbines will be carried out using a gas compressor station.

The gas compressor station is designed to compress a mixture of hydrocarbon gases, which serves as fuel for a gas turbine, where, with constant operation of the station, oil refilling, filter cleaning and other station maintenance are provided for preventive maintenance.

The following equipment and machines will be located on the territory of the repair and mechanical workshops:

- vertical drilling machine;
- milling machine;
- lathe.

Also, on the territory of the power plant there are warehouses for storing various materials (Table 11), household premises for working personnel and office premises for engineering and technical personnel.

Table 11 Characteristics of the raw and other materials and products used.

Item	Name	Quantity
1	Low-sulfur natural gas, m3	748.800.000
2	Diesel fuel for emergency diesel generator, tons	1.0
3	Compressor oil, tons	5.0
4	Turbine oil, tons	12,68
5	Transformer oil, tons	0.800
6	Engine oil, tons	0,200
Necessary chemicals and substances for water treatment and water purification		
1	Sodium Hypochlorite 12% liquid	30.0 tons
2	45% liquid caustic	6.0 tons
3	97% liquid sulfuric acid	30.0 tons
4	Liquid Antiscalant	8.0 tons
5	98% sodium metabisulfite crystalline	1.0 tons
6	Coagulant	4.0 tons

Table 12 Characteristics of the natural gas used.

Item	Components	Gas composition, mol %
1	Carbon dioxide, CO2	1,27
2	Hydrogen sulfide, H2S	0,0013
3	Methane, CH4	94,04
4	Ethane, C2H6	3,84
5	Propane, C3H8	0.36
6	i-Butane, i-C4H10	0.03
7	n-Butane, n- C4H10	0.04
8	i-Pentane, i-C5H12	0.01
9	n-Pentane, n- C5H12	0.01
10	Hexane, C6H14	0.05
11	Oxygen, O2	0.08
12	Nitrogen, N2	0.35
Other characteristics		
1	Gas density at 20°C (kg/m³)	0,715
2	Relative gas density at 20°C (kg/m³)	0,5935
3	The highest Wobbe number (kcal/m³)	10598,8
4	The lowest calorific value (kcal/m³)	8165,5
5	Molecular weight of the gas (g/mol)	17,155

4.2.8 Transport support

The nearest highways run in a northerly direction at a distance of 325 meters (A 376) and in a westward direction at a distance of 95 meters (M 39) from the designated site for the construction of a power plant.

The “Jizzakh-Khawast” railway line runs in a northerly direction at a distance of 60 meters from the site under consideration.

It is planned to build an access road from the M39 highway to the facility about 90 meters away.

Vehicles will undergo periodic maintenance and repairs off-site at service stations near the project area.

4.2.9 Waste management

At the projected 550 MW power plant in Sharaf-Rashidov district of Jizzakh region, after commissioning, waste of both industrial and household nature will be generated.

The main production process is the generation of electricity from the combustion of natural fuels. The operation of gas turbines involves the use of oils. The waste generated during the operation of this equipment is spent engine oils, which will be exported to specialized enterprises for the processing of such types of waste.

Sludge from boiler cleaning is formed when deposits (scale) are removed by flushing them with water. The water is neutralized and settled in a specially designated place. The

sludge generated in this case, characterized as sludge from cleaning equipment, will be sent to a settling tank for dewatering and then it is planned to be transported to a landfill for construction waste in accordance with an agreement with specialized organizations.

The main wastes in the turbine compartment are: spent turbine oil and compressor oil.

All used oils (compressor, turbine, transformer and motor oils) are subject to regeneration. If own oil regeneration plants are provided, then used oils can be regenerated at the enterprise itself. If not, the used oils will be exported to specialized enterprises for processing such types of waste.

Cable cuts containing non-ferrous metals for processing by “Ikkilamchi Rangli Metallar” LLC.

In the repair shop, where repair work is carried out, metal residues and electrode stubs are mainly formed. The scrap of ferrous metals, together with the electrode ends, is transferred for processing to “Ikkilamchi Kora Metallar” LLC.

Scrap of non-ferrous metals is formed during tool processing of metals, repair of instrumentation and control equipment, and is also contained in a damaged cable. The waste is not flammable, insoluble in water; it is chemically inactive under storage conditions. The scrap of non-ferrous metals is transferred for processing to “Ikkilamchi Rangli Metallar” LLC.

When washing the external heating surfaces of technological equipment in order to cool it, oily wastewater may form. They can form when there is a violation of density in the oil cooling system.

Also, oiled runoff can be formed as a result of rain flushing from the surface of the power plant site, stormwater will be separated from the oil using an oil separator (oil trap). The oils separated from the water are discharged into a receiving container, and as they accumulate, they are exported for processing to a specialized organization. The treated effluents should also be directed to the nearest treatment facilities.

During the operation of the power plant’s medical center, the following waste is expected to be generated (waste from the medical center): disposable syringes after disinfection, used dressing material. These wastes, in agreement with medical institutions, will be sent for disposal.

The main waste from the canteen of the power plant is food waste, which is transferred to feed the livestock of the local population.

The offices of the management and engineering staff are located in the office premises. Waste can be waste paper and human waste. As waste paper accumulates, it is handed over to Recycling.

In addition, during the operation of the power plant, the following types of waste are generated: waste LED lamps - when lighting the territory of the power plant and premises; oiled rags (more than 15%) - when wiping equipment; various containers - when unpacking various materials and reagents; worn-out overalls - during the life of the working personnel; municipal solid waste (MSW); estimates - when cleaning asphalt and green areas.

The generated municipal solid waste will be exported in accordance with the established procedure to landfills for MSW of “Toza Hudud” LLC in Jizzakh region.

At the designed power plant with a capacity of 550 MW in Sharaf Rashidov district of Jizzakh region, after commissioning, waste of both industrial and household nature will be generated of 21 types in the amount of 127.0 tons per year.

Detailed assessment of waste management activities is provided in Report 125-1105-ESIA-P0-3, Section 9.4.

4.2.10 Sanitary protection zone

In accordance with the requirements of SanR&N “Sanitary rules and norms for the protection of atmospheric air in populated areas of the Republic of Uzbekistan” No. 0350-17 for facilities that are sources of atmospheric air pollution, a sanitary protection zone should be organized, the width of which is determined by the class of production being located.

The size of the SPZ is determined, first of all, by the class of the enterprise according to the classification given in the specified sanitary rules, according to which thermal power plants belong to category 2 of environmental impact and must have SPZ size of 500 m from the sources of impact (clause 6.2. Production of electric and thermal energy by burning fuel (gas), item 1).

4.2.11 Accidental situation

The causes of emergencies at combined-cycle power plant can be various technical and other disruptions in the supply of materials and raw materials (natural gas, steam, water, electricity), as well as violation of the tightness of pipelines and equipment, accompanied by a leak of natural gas, fire, gas contamination, explosion or other phenomena that create a danger for the further operation of the facility.

The occurrence of emergency situations is possible due to various types of violations:

- technological failures caused by violation of the norms of the technological regime of production or a separate technological process;
- mechanical failures caused by partial or complete destruction, or wear of technological equipment, or individual parts;
- organizational and technical failures caused by the termination of the supply of raw materials, electricity, staff errors;
- situations caused by natural disasters, fires and possible explosions.

Emergency risks at a combined cycle power plant with a capacity of 550 MW in Sharaf Rashidov district of Jizzakh region during project implementation will be minimized through the use of a modern automated management and control system for the production process. The automated control system is designed to perform the functions of logical control, regulation in automatic and manual modes, emergency and restrictive protections, warning and alarm systems, monitoring, display and archiving of technological parameters, high-speed registration of major events and indicators in emergency situations.

4.3 Associated facilities (projects)

According to the IFC PS-1 definition, associated facilities – facilities that are not funded by the project and that would not have been built or expanded if the project had not been implemented, and without which the project would not be viable.

Also, as an additional criterion, the location of objects in close proximity to the site of the planned activity is usually considered.

Associated objects of the project are:

- new access road to the power plant with a length of about 90 meters is displayed on the general master plan;
- power lines with a length of approximately 8 and 10 km from the project area to the existing 220 kV overhead lines L-20-D and L-Z-C. – a draft scheme for the power output of a thermal power plant with possible connection options has been developed.
- gas pipeline – design has not been started, at the discussion stage.

- water supply route - design has not begun, at the stage of discussion, previously the beginning from the surface water intake, the drainage channel of the Jizzakh reservoir.

  In accordance with the Project Agreement, all connection points and the construction of linear facilities must be provided by local government agencies, gas and water supply organizations, and National electric networks.

As of June 2024, the associated objects of discussion and primary design are Figure 4.3.1; Figure 4.3.2.

Therefore, for associated properties, the ESIA materials will provide information reflecting only the current status of the projects.

Figure 4.3.1. - Associated objects (preliminary power line route)

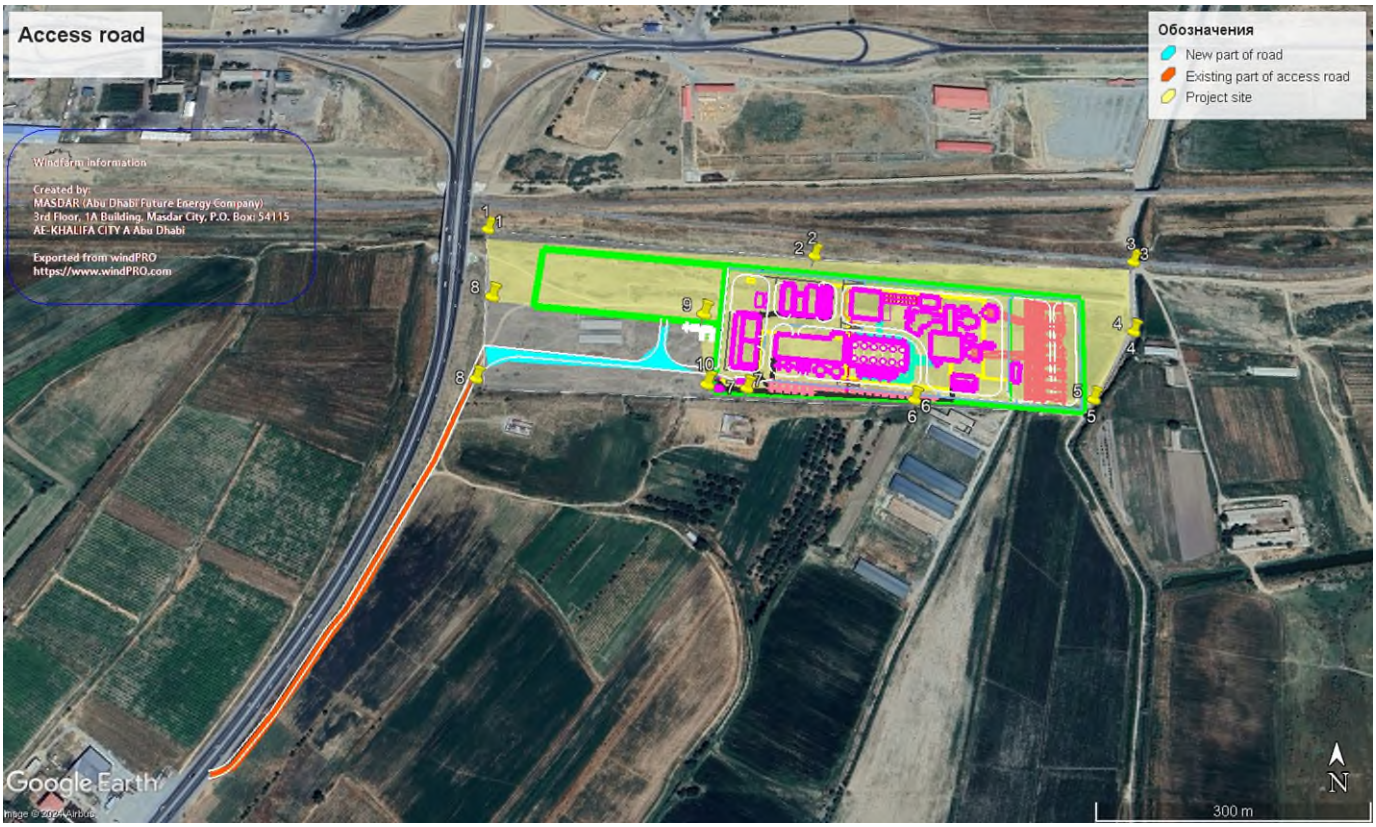


Figure 4.3.2. – Access road

Figure 4.3.3. – Surface water intake

4.4 Analysis of alternatives and options for planned activities

4.4.1 “Zero option”

“Zero option” – the conditional name of a possible alternative associated with the rejection of the planned activity. When assessing this alternative in accordance with the requirements of IFC PS-1, the following should be taken into account.

In recent years, significant positive changes have been observed in the legislation of the Republic of Uzbekistan, aimed both at improving the efficiency of energy industry enterprises, introducing energy-efficient technologies, and increasing the investment attractiveness of this sector of the economy as a whole.

It should be noted that within the framework of the “Concept of providing the Republic of Uzbekistan with electric energy for 2020-2030” it is stipulated the following:

- increase of electricity production from 63.6 billion kWh to 120.8 kWh;
- reduction of natural gas consumption in the production of electric energy from 16.5 billion cubic meters to 12.1 billion cubic meters;
- reduction of electricity transmission losses to 2.35% and distribution losses to 6.5% (1.85 times less than in 2019).

The implementation of these plans will ensure the energy security of the country, taking into account forecasts that in 10 years energy consumption in Uzbekistan will increase by almost 2 times.

At the same time, today the main part of the generating capacities (about 85%) are thermal power plants, and therefore, by 2030, it is projected to introduce 15.6 GW of new and modernized small generating capacities of thermal power plants. While 6.4 GW of physically obsolete equipment of generating capacities at large thermal power plants is projected to be decommissioned.

It is noted that plans to reform the electric power industry of Uzbekistan by 2030 have already been announced earlier, in the summer of 2019. It was assumed that the structure of generating capacities by 2030 would look like this: power units using natural gas will reach 16.3 GW, or 51% of the total capacity (now - 33%), hydroelectric power plants - 3.8 GW, or almost 12% (now - 16%), power units using coal, 2.6 GW, or 8.2% (now 11%).

Thus, the implementation of the project corresponds to the program for reforming the energy sector of the Republic of Uzbekistan.

Taking into account the above, the conclusion about the preference for considering the construction and operation of a combined cycle power plant compared to the “zero option” was made at the stage of preliminary environmental and social assessment (see 125-1105-SR), a detailed consideration of the “zero” option is not carried out.

4.4.2 Placement of combined-cycle power plant

Analysis of the available information suggests that the placement of a combined-cycle power plant in a designated area near Jizzakh city is optimal from the point of view of the effectiveness of investment costs.

The provision of the design electric capacity of a Combined-cycle gas turbine power plant with a capacity of 550 MW to the existing energy system will solve the issue of covering the shortage of energy supply in a number of districts of Jizzakh region and Jizzakh city.

The choice of the location of the combined cycle gas turbine power plant planned for construction is also due to the availability of available sources of water consumption, a gas pipeline and other necessary infrastructure.

At the same time, the construction of the combined-cycle power plant on a dedicated

site will be accompanied by:

- the need to obtain rights to new land plots – a site for the placement of combined-cycle power plant facilities and infrastructure facilities;
- significant withdrawal of land for the site and infrastructure – roads, utilities, etc.;
- need to organize a separate sanitary protection zone.

Thus, all other things being equal, the alternative location of the projected facility is less preferable due to the availability of existing infrastructure, access roads and a detailed comparison of different options for the placement of the construction site in the ESIA studies is impractical.

4.4.3 Technological solutions

When considering the issue of commissioning additional capacities for the production of electric energy and the construction of thermal power plants in Jizzakh region, it was also assumed to obtain electric energy using traditional gas-fueled power units.

Analysis of all parameters, including the type of fuel used, fuel consumption per 1 kW/hour, efficiency and, accordingly, the amount of electric energy produced showed that compared with traditional generators, a combined cycle combined cycle power plant running on gas for electricity generation consumes 2.0 times less fuel and efficiency is more than 61%, whereas in in traditional power units - below 45%.

The construction time of the Gas piston instalation is much shorter than the construction time of powerful thermal power plants of other types.

The use of a combined-cycle cycle makes it possible to improve the environmental performance of an energy enterprise and significantly reduce the level of environmental pollution. Compared with steam turbine and gas turbine power plants, the proposed technology will reduce the consumption of natural gas and, accordingly, emissions of pollutants, in particular nitrogen oxides into the atmosphere.

4.5 Aspects of proposed activities and related impacts

4.5.1 Environmental aspects and related impacts

At the stage of preliminary assessment, the following components of the environment are identified, which may be affected by the proposed activity:

- lands;
- atmospheric air;
- soil;
- surface waters;
- the groundwater;
- flora and fauna.

Environmental aspects of the proposed activity, which are accompanied by impacts on environmental components, the population, personnel and are further considered as part of the ESIA studies, are presented in Table 4.5.1.

Table 4.5.1 - Environmental aspects of the planned activities

Activity/ process	Environmental aspects	Potential impacts	Recipients
Placement of objects of planned activity	• Land seizure [4]– the actual seizure was made as a result of the allocation of a plot for the construction of a power plant • the implementation of associated projects is not being considered at this stage [15]	• Habitat removal • Violation of the soil cover	• Soil cover • Vegetable world • Animal world
Construction works (earthworks, civil works)	• Air emissions of pollutants • Water reduction in construction workings • Generation of surface wastewater • Noise • Waste generation	• Changes in the structure of land use • Changes in atmospheric air quality • Changes in the hydrological and hydrochemical regimes of surface and groundwater • Changes in the acoustic regime of the territory • Indirect effects on environmental components in the area of waste disposal facilities	• Atmospheric air • Surface water • Groundwater • Soil cover • Vegetable world • Animal world • Population • Personnel

Activity/ process	Environmental aspects	Potential impacts	Recipients

[4] Associated objects are at the stage of approval and initiation, evaluation is not carried out

Main production activity (electricity generation)	• Air emissions of pollutants • Generation of industrial wastewater • Noise • Waste generation	• Changes in atmospheric air quality • Greenhouse gas emissions/climate change • Changes in the acoustic regime • Indirect impacts on flora and fauna, soils • Indirect impacts on the components of the natural environment in the area of waste disposal sites	• Atmospheric air • Groundwater • Surface water • Soil • Vegetable world • Animal world • Population • Personnel
Provision of the main production activities – repair work, water supply, sanitation, cleaning of the territory and industrial premises	• Air emissions of pollutants • Surface water intake • Generation of surface wastewater • Generation of industrial wastewater • Noise • Waste generation	• Resource withdrawal – surface water abstraction • Changes in atmospheric air quality • Changes in hydrological and hydrochemical regimes of surface waters • Changes in the acoustic regime • Indirect impacts on flora and fauna, soils • Indirect effects on environmental components in the area of waste disposal facilities	• Atmospheric air • Groundwater • Surface water • Soil • Vegetable world • Animal world • Population • Personnel
Transport and logistics (delivery of materials, fuels and lubricants, other transportation, storage of hazardous materials)	• Air emissions of pollutants • Generation of surface wastewater • Noise • Waste generation	• Changes in atmospheric air quality • Greenhouse gas emissions/climate change • Change in the acoustic regime of the territory	• Atmospheric air • Population

Activity/ process	Environmental aspects	Potential impacts	Recipients
Heat and power supply	• Air emissions of pollutants • Generation of surface wastewater • Generation of industrial wastewater • Noise • Waste generation	• Changes in atmospheric air quality • Greenhouse gas emissions/climate change • Changes in the hydrochemical regime of surface waters • Changes in the acoustic regime of the territory • Indirect impacts on the components of the natural environment in the area of waste disposal sites	• Atmospheric air • Surface water • Population • Personnel
Ensuring the needs of personnel (including at the construction stage)	• Formation of household effluents • Generation of household waste and waste equivalent to it (office waste, food waste),	• Changes in the hydrochemical regime of surface and groundwater • Indirect impacts on the components of the natural environment in the area of waste disposal sites	• Surface water In the area of waste disposal sites: • Atmospheric air • Soil cover • Vegetable world • Animal world • Population

4.5.2 Social aspects and related impacts

At the preliminary assessment stage, the following components and elements of the social environment are identified, which may be affected by the proposed activity:

- lands;
- population;
- personnel;
- health and safety;
- labor market;
- labor and working conditions
- cultural heritage.

Social aspects of the combined-cycle power plant and planned activities, which are accompanied by impacts on the components and elements of the social environment, discussed further in the ESIA, are presented in Table 4.5.2.

Table 4.5.2 - Social aspects of the planned activity

Activity/ process	Social aspects	Potential impacts	Recipients
Placement of objects of planned activity	• Seizure of land[5]	• Seizure of farm lands • Loss of income	• Farmers/ farming • Farm staff
Construction works (earthworks, civil works)	• Seizure of land • Public health and safety • Labor market • Labor and working conditions • Cultural heritage	• Changes in the structure of land use • Restricting access to resources • Growth in traffic and construction equipment • Training, advanced training, employment • Influx of employees • Public order violations • Child and forced labor • Public health and safety impacts • Personnel health and safety impacts • Impacts on cultural heritage sites	• Farmers/farms • Farm employees • Population • Personnel • Cultural heritage sites
Main production activity (electricity generation)	• Public health and safety • Labor market • Labor and working conditions	• Accidental situation • Income of the population from the development of the enterprise • Training, advanced training, employment • Personnel health and safety impacts • Personnel health and safety impacts	• Population • Personnel

[5] actual seizure was made as a result of the allocation of a site for the construction of an object.

Activity/ process	Social aspects	Potential impacts	Recipients
Provision of the main production activities – repair work, water supply, sanitation, cleaning of the territory and industrial premises	• Public health and safety • Labor and working conditions	• Resource withdrawal – surface water abstraction • Growth in traffic and construction equipment • Accidental situation • Personnel health and safety impacts • Personnel health and safety impacts	• Population • Personnel
Transport and logistics (delivery of materials, fuels and lubricants, other transportation, storage of hazardous materials)	• Public health and safety • Labor and working conditions	• Growth in traffic and construction equipment • Accidental situation • Personnel health and safety impacts • Personnel health and safety impacts	• Population • Personnel
Heat and power supply	• Public health and safety • Labor and working conditions	• Restricting access to resources • Changes in the acoustic regime • Accidental situation • Personnel health and safety impacts • Personnel health and safety impacts	• Population • Personnel
Ensuring the needs of personnel (including at the construction stage)	• Public health and safety • Labor and working conditions	• Training, advanced training, employment • Influx of labor and construction camps • Public order violation • Child and forced labor • Personnel health and safety	• Population • Personnel

5 DISCLOSURE OF INFORMATION AND INTERACTION WITH STAKEHOLDERS

This section reviews the disclosure, consultation and stakeholder engagement activities implemented as part of the ESIA process. The section summarizes the results of these activities and identifies activities planned for future stages of the project life cycle, as detailed in the Stakeholder Engagement Plan.

In particular, the section presents:

- principles for conducting consultations;
- consultation requirements;
- key stakeholders and consultants;
- consulting activities of the project and their results;
- project grievance mechanism.

50.1 Principles for conducting consultations

Early and ongoing consultation, disclosure and meaningful stakeholder involvement are key requirements for projects financed by International creditors. The ESIA builds on the results of the consultation activities included in the Stakeholder Engagement Plan (SEP), designed to guide the stakeholder engagement and disclosure process throughout the life of the project.

SEP is designed to guide public consultation and disclosure activities through to the completion of the ESIA, at all stages of the project life cycle. This is a strategic document for planning meaningful and appropriate consultations with key stakeholders and will be updated periodically as the Project progresses. Stakeholders are defined as individuals and entities that have an interest in, are affected by, or may influence the results of the Project. The specific objectives of the SEP are to provide a consultation strategy for the Project in order to:

- Ensure that all legal and international requirements related to consultations are met.
- Involve the entire range of stakeholders in Project planning to improve design, implementation and monitoring of project activities.
- Encourage open dialogue with affected communities (ACs) in the territories of the Project implementation.
- Inform all interested and affected parties about the progress of the Project.
- Provide a grievance redress mechanism so that ACs can submit grievances and be sure that they will be properly addressed by the Project.

The SEP is based on the principles that community engagement should be free from external manipulation, interference, coercion and intimidation, and conducted on the basis of timely, relevant,

understandable and accessible information. Consultation activities should always be well planned and based on the principles of a respectful and meaningful dialogue.

50.2 Consultation requirements

5.2.1 Review

This section provides an overview of national and international disclosure, consultation and stakeholder engagement requirements applicable to the Project.

As required by the Terms of References, the Project must comply with IFC Environmental and Social Policy on Environmental and Social Sustainability, the requirements of the IFC PS, and best international industry practice regarding information disclosure and stakeholder engagement.

These requirements have been taken into account in stakeholder engagement planning and are the basis of the consultation process for the Project, as described below.

5.2.2 National consultation requirements

Public engagement and disclosure of information begins at the earliest stages of Project planning and is regulated as part of the national environmental impact assessment process (hereinafter referred to as the ESIA).

“Regulations on the procedure for holding public hearings of environmental impact assessment projects”, (Appendix No. 3, DCM of the Republic of Uzbekistan No. 541 dated on 07/09/2020) regulates the procedure for holding public hearings on planned, planned or ongoing activities related to a high risk of environmental impact (hereinafter referred to as Category I) and an average risk of impact (hereinafter referred to as Category II).

A summary of the non-technical nature of the proposed, planned or ongoing economic activity is submitted for public hearings, including:

- brief description of the activity;
- review of options for technological solutions and solutions for the sites of the planned activity;
- brief assessment of the existing environmental and socio-economic conditions;
- brief description of the sources and types of negative impact on the environment associated with the implementation of the project;
- forecast and assessment of possible changes in the state of the environment and socio-economic conditions;
- forecast and assessment of possible design emergencies;
- measures to prevent, minimize and (or) compensate for negative impacts;
- assessment of possible significant transborder impact (if applicable).

Also, public hearings can be held on existing activities of I and II impact categories in case of legitimate complaints from individuals or legal entities.

Public hearings imply equal rights for everyone to express their reasoned opinion on the issue under discussion based on the study of documentary information related to the issue under discussion and not containing confidential information.

Participants of public hearings are stakeholders, including:

- non-governmental non-profit organizations;
- Citizens' self-governance bodies;
- mass media (hereinafter referred to as mass media).

Representatives of the authorized bodies for ecology and environmental protection participate in public hearings as observers.

The organizers of public hearings are district (city) khokimiyats.

The results of the public hearing are documented in the protocol of the public hearing, which is signed by the chairman and the secretary.

One copy of the protocol is provided to the customer within one working day, the second copy remains with the organizer of the public hearing.

Information about the public hearing, with a copy of the protocol attached, is sent by the organizer of the public hearing for information to the territorial bodies of the Ministry of Ecology, Environmental Protection and Climate Change.

As a result of the public hearing, a decision may be made on public support for the proposed or planned economic activity in the territory under consideration or on the refusal of public support for the proposed or planned economic activity in the territory under consideration.

Public hearing is considered competent only if at least ten representatives of stakeholders participate in it.

The customer, at the stage of development of the EIS, conducted public consultations and hearings, however, the current approach to public consultation in Uzbekistan does not require the involvement of the general public and is often limited to consultations with authorized government agencies, planning for stakeholder participation and disclosure of information about the Project is based on international industry best practice and applicable international requirements.

5.2.3 International consultation requirements

According to the IFC project categorization, the Project belongs to Category "A".

The project was assigned "A" category, because the proposed activity is expected to cause significant environmental and/or social impacts, which, at the time of its categorization, are difficult to identify or assess and therefore require a comprehensive environmental and social impact assessment based on broad public participation and disclosure to key stakeholders.

IFC PS-1 on Assessing and Managing Environmental and Social Risks and Impacts includes relevant requirements for disclosure and stakeholder consultation activities. Activities must:

- start early in the project cycle;
- continue on an ongoing basis throughout the project life cycle;
- be based on the early disclosure and dissemination of relevant, transparent, objective, meaningful and easily accessible information in the relevant local language(s) and in a format that is culturally appropriate and understandable to the local population;
- be directed primarily at the affected parties, as opposed to those indirectly affected by the project;
- be free from external manipulation, interference, coercion or intimidation;
- ensure meaningful participation and meaningful dialogue with the public, where appropriate;
- documented.

IFC's Access to Information Policy specifies that Category A projects must disclose a summary of the review's findings and recommendations and include, at a minimum, the following information:

- identification of Performance Standards and applicable mechanisms for dealing with complaints, including a compliance advisor/ombudsman;
- justification for determining the category of the project according to the IFC classification;
- a description of the main social and environmental risks and impacts of the project;
- key measures to limit such risks and impacts, as well as additional measures and actions that must be implemented to comply with the IFC PS in the implementation of the project;
- electronic copies or links to websites where the ESIA materials are posted;
- additional documents such as action plans, stakeholder engagement plans, resettlement action plans, etc.

50.3 Stakeholder identification;

Stakeholders identified by the Project – individuals or groups of individuals directly or indirectly affected by the Project, as well as possibly having their own interests in relation to the Project and/or the ability to influence its results, both positively and negatively.

Stakeholders may include vulnerable or disadvantaged groups of the population or persons living in the Project area of influence, their official and non-official representatives, regional and district government authorities or local self-government bodies, public organizations and special interest groups, academia or educational institutions.

Currently, nine main groups of stakeholders have been identified in relation to the Project. Table 5.3.1 presents an analysis of stakeholders, their interests in relation to the Project, as well as proposed methods of information disclosure and interaction with them.

Table 5.3.1 - Project stakeholders and methods of interaction with them

Stakeholder group	Status					Interaction methods													
	Main	Indirectly stakeholder	Affected Party	Stakeholder	Decision-making party	Personal meetings	Official correspondence	ESIA Disclosure	Consultations on land alienation	Publication of the PAS [1]	Publication of personnel policy	Consultations on staff reduction	Interaction with PRS	Interaction with the Head of Environmental	Interaction with the head on labor and social issues	Mechanism for receiving complaints from the population	Employee grievance mechanism	Monitoring and reporting	Website of the
Affecting the population, vulnerable and socially disadvantaged populations																			
Residents of Jizzakh city, Sharaf-Rashidov district of Jizzakh areas, including vulnerable and disadvantaged groups:	x		x		x					x		x	x		x			x	
people with disabilities	x		x		x					x		x			x			x	
pensioners	x		x		x					x		x			x			x	
poor population	x		x		x							x			x			x	
unemployed	x		x		x					x		x	x		x			x	
women and female-headed households	x		x		x					x		x			x			x	
children under the age of 15	x		x		x							x			x			x	
Local farmers whose farms may be affected as a result of the Project	x		x		x	x		x	x	x			x		x			x	
Makhallas - Gozgontepa, Chalkobad, Sukokli and Olmachi.	x		x		x	x		x		x		x	x		x				
Employees, applicants, third party employees, and employee representatives																			
Local residents	x		x		x					x	x		x	x	x	x	x		x
Employees of “CENGIZ ENERJI SAN. VE TIC A.Ş”	x		x		x					x	x		x				x		x
Construction employees	x		x		x								x			x	x		x
Trade unions and employees representatives	x		x			x				x	x		x		x	x	x		x
The lender bank		x		x			x	x	x	x	x				x				
International Labour Organization		x		x			x			x			x						
Territorial and regional state authorities, local self-government bodies, controlling and state organizations																			
National electric networks		x		x			x	x		x			x	x	x				
the Ministry of Energy of the Republic of Uzbekistan		x		x			x	x		x			x	x	x				
the Ministry of Employment and Labor relations		x		x			x	x		x			x	x	x				
the Ministry of Foreign Affairs of the Republic of Tajikistan		x		x			x	x		x			x	x	x				
Khokimiyat of Jizzakh city	x		x			x	x	x	x	x			x		x				
District khokimiyat (Sharaf Rashidov district)	x		x			x	x	x	x	x			x		x				
Local environmental authorities	x		x			x		x		x			x		x	x			
Local cadastral authorities	x		x			x		x	x	x			x		x	x			
Local labor and employment authorities	x		x			x		x		x			x		x				
Department of Cultural Heritage of Jizzakh region	x		x					x	x	x			x						
Consultants of																			
ALFA LINE (Encompass) LLC	x		x			x			x	x				x					
Public associations and organizations																			
Uzbek-German Forum on Human Rights International Anti-Slavery Organization International Labor Rights Forum Women’s Committee of Uzbekistan Others (to be identified through SEP disclosure)		x		x						x			x		x				
Contractors, suppliers and private enterprises																			

Local suppliers of raw materials and materials	x		x			x				x			x		x	x	x		
Local construction contractors	x		x			x			x	x			x		x	x	x		x
Other enterprises (to be identified through SEP disclosure)	x		x			x				x			x						
Other stakeholders																			
Local newspapers, local radio stations, local TV channels		x		x		x			x	x	x		X		x				

50.4 Activities and results of project consultations

5.4.1 Review

This section describes the activities undertaken during the ESIA process and their results, and briefly describes the activities planned for the remainder of the Project life cycle in accordance with the SEP and the requirements set out in Section 5.2.

5.4.2 Local community representatives

The project initiators will cooperate with local governments in the project area - makhallas. Makhallas are headed by the elected chairmen of the citizens' assembly and are supported by councillors and representatives of the khokimiyats (advisers on issues of the elderly and veterans, youth and women, community security, sports, etc.).

In order to reach members of communities located near the project area who do not have access to the Internet, such as elderly people or poor families, the Customer will maintain contact with makhalla chairmen, collaborating directly on stakeholder engagement activities.

Printed copies of the project documentation and non-technical summary (NTS) will be placed in the makhallas located in the project's area of influence. Representatives of local communities will be invited to encourage the participation of residents in the consultation process, as well as receive feedback from their communities and transfer it to a public relations specialist (PRS). The role and functions of the PRS are discussed in more detail in subsection 5.4.3.

5.4.3 Public relations specialist

The Customer's organization appointed a specialist responsible for public relations (Community Liaison Officer (CLO), whose responsibilities include ensuring at all stages of the Project constructive and meaningful interaction with local residents who are affected by or interested in the implementation of the Project.

PRS will function throughout the entire life cycle of the Project. PRS is responsible for implementing the SEP activities. In addition, PRS is responsible for organizing and holding meetings with stakeholders, taking minutes of them, as well as ongoing interaction with the population in the Project area of influence.

A quality assurance/quality control engineer, Galina Galeeva, has been appointed as the person responsible for interaction with the public, in particular for receiving, registering and working with requests and complaints from citizens at the stage of project preparation, during the construction period and at the operation stage.

5.4.4 ESIA Consulting and Disclosure

Identification of Project stakeholders was initiated at the stage of preparing the Preliminary Environmental and Social Assessment Report (Scoping report) based on the results of an inspection of the site and surrounding areas, desk research and initial consultations with regional and local authorities

and local self-government bodies. In October 2021, a series of consultations were held with the following Project stakeholders:

- Khokimiyat of Jizzakh city;
- Khokimiyat of Sharaf Rashidov district, Jizzakh region;
- Department of Ecology and Environmental Protection of the Jizzakh city and Sharaf-Rashidov district;
- The Center for sanitary and epidemiological supervision of the city of Sharaf Rashidov district;
- Department of Cultural Heritage of Jizzakh region
- Employment Center of Sharaf Rashidov district;
- Makhallas - Gozgontepa, Khalkobod, Sukokli and Olmachi.

Consultations are used to disclose information about the Project, explain the ESIA procedure, request baseline data, identify related projects, stakeholders and their interests, and understand concerns about the Project. The health and safety of the population are of concern, providing vulnerable and unprotected segments of the population with the opportunity to take advantage of the positive effects of the Project.

The Preliminary Environmental and Social Assessment Report (Appendix 1) provides an overview of the dates, participants and key issues raised during the pre-consultation process. All these events were carried out in the form of personal meetings with the participation of representatives of the Customer and Project consultants.

The second stage of consultations is scheduled for June-July 2024. During the period of basic social research conducted:

- Focus groups (women, youth, residents of the project area) with representatives of Gozgontepa, Chalkobad, Sukokli and Olmachi makhallas. These makhallas were identified at the stage of the initial assessment of the project in consultation with administrative authorities and responsible representatives of the Customer, as populated areas 1-2 km from the boundaries of the combined-cycle power plant;
- in-depth interviews with farms affected by the project during the construction of the facility (verification of land alienation procedures, compensation payments);

Table 5.4.1 provides a list of all the focus groups conducted.

Table 5.4.1 - List of focus groups

Item	Date	Region	District /makhalla	Number of participants	Participants
1.					
2.					
3.					
4.					
5.					
6.					
7.					
Total					

Brief description of information disclosure measures implemented in May-June 2024 is presented in Table 5.4.2.

Table 5.4.2 - Information disclosure measures.

Measures	Result
Publication of the Report on the ESIA Research Program	Project documents are published in Russian and English. Disclosure was made on the website of the Customer, within ten days from the date of publication of the ESIA Study Program Report. The contact information of the responsible representative of the UMK (e-mail, address, phone number) was indicated on the website.
Receiving comments and suggestions on the ESIA Study Program Report	The collection of comments and suggestions lasted until June 15, 2024. The Customer confirmed to the Consultant that during the reporting period no comments or suggestions were recorded from stakeholders.

5.4.5 Consultations planned during the project implementation period

The project SEP describes the ongoing engagement with stakeholders throughout the project life cycle, including the construction and operation phases. Activities include consultations as needed with makhalla representatives, disclosure of information to the local population at key stages of the project, such as the start and end of construction, regular website and social media updates, SEP updates, and annual project reporting.

50.5 Programs for the involvement of the local population and the asset of the local population

Currently, the project promotes sustainable engagement with local communities to align their interests and turn the community into a direct stakeholder.

To increase the potential for interaction with the local community, the Customer is recommended to:

- communicate the most complete information about the project activities in a timely manner to all Stakeholders.
- develop and implement a transparent recruitment procedure among the residents of the region (including women, youth, representatives of vulnerable groups).

- prepare and implement a social investment program based on regular consultations with stakeholders.
- provide assistance to the participation of small and medium-sized businesses in the project's activities and implement social partnership measures in the region of presence.

50.6 Project Grievance Mechanism

Draft defines a complaint as an actual or perceived problem that may give rise to a complaint. As a general policy, the Customer will actively work to prevent the causes that give rise to complaints through the implementation of mitigation measures (as defined in the ESIA and ESMP) and ongoing interaction with community relations specialists.

Anyone will be able to file a project activity grievance if they believe that a practice has a negative impact on them, the community, the environment, or the quality of life. Stakeholders can also submit their comments and suggestions.

50.7 Confidentiality and anonymity

The Customer will take measures to ensure confidentiality (upon request) and guarantee anonymity in the preparation of annual reports. Disclosure of personal data of individuals will be carried out only with their consent.

Investigations will be conducted with respect for the injured party and confidentiality. The injured party will have to recognize the need to disclose personal data in certain situations, and the Customer's representatives will identify such situations and request appropriate consent to continue the investigation and resolve the situation.

50.8 Complaint reporting and resolution

The Grievance Redress Mechanism, detailed in the SEP, is a formalized tool for receiving, recognizing, investigating and addressing complaints, grievances and concerns from affected communities and individuals, as well as other stakeholders.

The purpose of this mechanism is to offer predictable, transparent and credible processes for all parties that produce relatively inexpensive, fair and efficient results. It also aims to ensure a gender sensitive, inclusive and culturally appropriate process that will be accessible to all members of the community.

Effective stakeholder engagement aims to build trust and maintain a constructive relationship with communities and stakeholders, foster a positive perception of the Project and contribute to its successful development and implementation.

5.8.1 National Complaint Resolution Requirements

Management of public complaints and claims in Uzbekistan is carried out on the basis of an established mechanism in accordance with the Law of the Republic of Uzbekistan No. LRU-378 dated on 03/12/2014 No. LRU-378 dated on 03/12/2014. Stakeholders can submit their complaints through the Internet portal https://my.gov.uz/ru. In addition, since 2017, so-called “Public Consultation Points” have been functioning in each region, district, city and village, where people can come with their complaints and appeals.

The Ministry of Employment and Labor Relations of the Republic of Uzbekistan operates a feedback mechanism to deal with any labor-related complaints that are investigated by local labor relations inspectors throughout the country. This feedback mechanism is available through the hotline number
+998 71 200-06-00.

The Federation of Trade Unions also receives and investigates work related complaints through the hotline number (0-371) 200 10 92 .

To achieve national compliance, the grievance redress mechanism under the project will not prevent affected persons from contacting national/state legal systems to resolve grievances at any stage of the grievance redress procedures. Affected parties may apply to the court at any stage of the complaint or appeal process

5.8.2 Handling requests and reporting

The Customer has its own Internet resource https://cengizenerji.com.tr/?lang=en/ and a separate link for disclosing information about the Project_____, as a tool through which the public can submit complaints and appeals. Complaints and appeals can also be sent directly to the CLOs. CLO data are shown in Table 5.8.2.

The main stages of work with complaints and appeals include: receiving and registering, categorizing, investigating, preparing a response, demands/appeals, providing a response and closing a complaint / appeal.

Receipt/registration: Complaints and appeals will be recorded in a formal complaint registration system maintained by the CLO.

Complaints can be submitted in writing by filling out a special form (provided in the SEP Appendix), by contacting the CLO directly, through a local government representative, or electronically through the Customer website. Contact information of the CLO will be provided in the Project information materials, e.g., in the non-technical summary.

Categorization: all incoming requests will be classified by the CLO in accordance with the criteria as indicated in Table 5.8.1.

Investigation: In cases where an investigation is required, the appropriate employees of the Customer and external organizations will provide the necessary assistance in this. The CLO in conjunction with the Customer’s management will form an investigation team to include specific specialists whose qualifications are appropriate to the subject matter of the appeal.

The purpose of the investigation will also be to determine the nature of the event that gave rise to the request, i.e. whether it was an isolated event or whether it may recur. During the investigation, the necessary measures, procedures will be identified and implemented, the necessary equipment will be allocated or training will be conducted in order to eliminate the incident and prevent its recurrence.

Response: The CLO shall give the complainant a written (or, if it is difficult for the complainant to understand the written text, verbal) explanation of the complaint procedure, its results, the actions to be taken to address the causes of the complaint, as well as the work being done on the issue to ensure compliance with relevant environmental and social

management systems. In certain cases, the CLO will monitor how satisfied the applicant is with the decision or action taken.

Table 5.8.1 - Criteria for classifying complaints/appeals

Criteria	Level of risk (to health, safety, or the environment)	Resolution
Low	None or low	The complaint may not be related to the Project, the received appeal may be a comment or a request. PRS recognizes the complaint within 3 days and conducts an investigation, documents its results and gives a response within 14 days from the date of receipt of the complaint
Medium	Potential Risk and Single Incident	PRS recognizes the complaint within 3 days. The CLO acknowledges the complaint within 3 days. The Site Manager or Health and Safety Manager, if necessary, may decide to suspend work until the investigation is completed, in order to determine the necessary measures to correct the violation. PRS responds to the appeal within 14 days from the date of receipt of the complaint. Measures to eliminate the violation can be simple, quick, for example, related to changing the procedure, and low-cost
High	Probable risk and possibility of recurrence	PRS recognizes the complaint within 3 days and involves the project manager in the formation of a special group for prompt investigation and settlement of the complaint. The CLO responds to the complaint within 14 days from the date of receipt of the complaint. If more time is required to resolve the complaint, the PRS informs the complainant of this within 14 days from the date of receipt of the complaint and sends a response within 30 days. If necessary, the response can be in the form of a press release.

Closure: in the registration log, the complaint is closed as follows:

- Settled. Response communicated, agreed to, and/or implemented.
- Not settled. The complainant disagrees with the decision and has applied to other organizations for settlement.
- Denied. Applicant cannot be contacted and cannot be traced.

CLO will report on the activities of the treatment of appeals on a monthly basis in the preparatory stage, weekly during construction and twice a year during the operational phase, excluding personal data of applicants in order to protect confidential information and guarantee anonymity.

This procedure will be free of charge and excludes any prosecution of persons affected by the Project or other interested parties. The proposed procedure for dealing with appeals is schematically presented in the Appendix to the SEP.

Quality assurance/quality control engineer, Galina Galeyeva, has been appointed responsible for considering appeals from citizens and other stakeholders. Comments and appeals should be sent to the address below (preferably in writing by filling out the complaint/appeal form provided in EPA Appendix).

Table 5.8.2 - Public Relations Specialist

To	Quality Assurance/Control Engineer – Galina Galeyeva
Address	
Phone	+998 88 330 00 20
Email	nailya.galeyeva@cenergo.uz

5.8.3 Reporting of complaints and appeals

The CLO will be responsible for preparing the following reports:

- monthly reports on received complaints to the management of the Customer at the stage of preparation of the Project;
- weekly reports on complaints received by the management of the Customer at the construction stage;
- semi-annual reports on received complaints to the management of the Customer at the stage of operation;
- annually provide information on complaints received to international creditors as part of the annual reporting on environmental and social aspects of the Project implementation.

5.8.4 Annual reporting

During the term of the loan agreement, the Customer will prepare an annual report to international lenders, which will summarize information on the implementation of environmental protection and labor protection requirements, the progress of implementation of the ESMP, the activities of the PRS and the complaints received from the population, as well as updates to the SEP.

“CENGIZ ENERJI SAN. VE TIC A.Ş.”

Construction of combined-cycle power plant with a capacity of 550 MW

Environmental and social impact assessment

Preliminary report

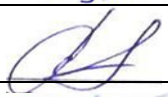
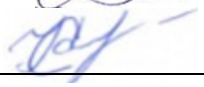
Book 2

125-1105-ESIA

REGISTRY OF DOCUMENT VERSIONS

Item	Version	Date	Status
1.	125-1105-ESIA Version_P0 Book 2	08-07-2024	Preliminary Version of the Report sent by “CENERGO” LLC

LIST OF PERFORMERS

Head, Project Coordinator	O. Vakhidova-Mordovina	
Chief ecologist	G. Petraeva	
Ecologist	L. Konanyuk	
Chief sociologist	B. Mavlyanov	
Acoustician	S. Kasimkhodjaeva	
Sociologist, communications specialist	M. Rasulmetov	
Ecologist/Atmospheric air specialist	N. Limankina	
Chemist-hydrologist	S. Kim	
Radiation Safety Specialist, PhD in Technical Sciences	M. Salimov	
Biodiversity specialist	N. Beshko	
Biodiversity specialist	T. Abduraupov	
Hydrobiologist	Z. Mustafaeva	

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6.1 Climate

Analysis of climatic characteristics of the area where a combined cycle power plant with a capacity of 550 MW is located, was carried out according to the observation data received from the “Uzhydromet” Service at the nearest weather station located in the Jizzakh city.

The climate of Jizzakh city is sharply continental with cold winters and hot summers. The average annual temperature is +15.2°C, the maximum air temperature reaches +42.7°C, the minimum is 31.5°C below zero. The average air temperature for the month of July is +26.71°C, the average temperature for January is -1.49°C. The average annual relative humidity is less than 30%.

The winter period is characterized by extreme weather instability, the development of clouds, frequent precipitation and rapid changes in temperature and humidity. The coldest month of the year is January. In January, the average monthly temperature ranges from 0 to -5.4°C. Low temperatures are observed in the northern part of the region, which is facilitated by its open position in relation to the northern cold invasions.

Absolute minimum air temperatures range from -29 to -34°C, average absolute minimums from -18 to -26°C. A significant part of the territory of Jizzakh region is characterized by moderate frosts both in the mountains and in the valley. Winters are mild in most of the flat territory of the region, and moderately cold in the far north and in the mountains.

The snow cover in the flat part of the territory is unstable. The number of days with snow cover is insignificant: on average 30-34 days during winter. Stable snow cover is formed in the mountains from a height of 1000 m. The duration of stable snow cover is more than two months. The height of the snow cover in the flat part of the region is low. On average, its long-term average values for 10 days range from 4 to 8 cm, but in some cold winters they can be much higher (in 1969, the snow depth in Jizzakh was 48 cm).

Significant changes in air temperature with weak snow cover lead to soil freezing. The maximum freezing depth reaches 50 cm. In most of the territory, the frost-free period is long: 200-220 days, the shortest frost-free period is observed in the mountains - 170 days.

Summers are hot and dry. The absolute maximum air temperature in the entire territory of Jizzakh region reaches 45-47°C. According to the absolute maximum, the southern part of the Hungry Steppe is the hottest not only in Jizzakh region, but also in Uzbekistan, second only to some areas of the southern regions.

The entire summer period and most of autumn are characterized by a small area and a large number of clear days. The largest number of clear days is observed in August and reaches an average of 27-28 days. Cloudy days are mainly observed in the winter-spring period. The average number of cloudy days in a month is 10-15.

The state of the atmosphere is significantly influenced by the amount and intensity of precipitation, which performs a cleansing function.

Annual precipitation in most of the region is low at 376.8 mm. In the annual course, the largest share of precipitation falls in the autumn-winter-spring period. In summer, they usually do not fall on the flat part of the precipitation. Precipitation also falls in the mountains in summer.

The annual distribution of precipitation is characterized by the greatest moisture in the winter-spring period, the least in the summer. The monthly maximum precipitation is observed in March and April, the minimum falls in September. Fogs are very rare, the average annual number of days is 5. Fogs are most often observed in the winter months.

The penetration of cold air masses through the northern open part of the region in winter causes a sharp drop in temperature. Frosts occur even in late spring, they cause

damage to fruit trees and crops.

Local terrain features also have a significant impact on the wind regime. With the approach of the mountain hills near the northern slopes of the Nuratin range, the wind changes direction to the southwest.

In the area of Jizzakh city, the prevailing winds are western, northern and northwestern directions from the “Tamerlane Gate”. The average annual wind speed is 2.5-6 m/sec.

Dry winds and dust storms are among the adverse weather events in the territory of the region. In rain-fed areas, as well as in years when there is not enough irrigation water in irrigated areas, dry winds damage plants at different stages of their development, which leads to significant crop losses. Dry hot winds of low intensity are observed annually throughout the region and intensify near desert areas. The highest frequency of their occurrence is observed in the area of Galliarala and Jizzakh. Dust storms are observed throughout the region, but most of all in the flat part of it. Dust storms are most common in the Galliarala area.

The aridity of the climate and wind activity increase air pollution due to natural dust, which increases dramatically during dust storms and dry winds.

An important meteorological characteristic that determines the conditions for the dispersion of pollutants in the atmosphere is the wind speed. Weak winds contribute to the accumulation of pollutants coming from low emission sources.

Weak winds (0-1 m/sec and 2-3 m/sec) prevail in the considered area – 93.49% of cases.

Winds with a speed of 4-5 m/s, which contribute to the transfer of impurities from high hot springs, account for 5.39% of the annual distribution.

North winds prevail in Jizzakh city. The average annual frequency of these winds is 26.61%. Such winds are most frequent in spring and summer. It should be noted that the average annual wind speed of the eastern and southern directions is 8.21 and 7.84 m/s. The average annual frequency of strong winds (15 m/s) is low and is 0.02%.

The climatic conditions of the area contribute little to the dispersion of impurities without significant accumulation in the surface layer during periods of inversions.

Thus, based on the analysis of climatic characteristics, we can conclude that high temperatures in the warm season of the area, aridity of the surface, prevailing weak winds causing stagnation, contribute to the accumulation of pollutant emissions from low-lying unorganized sources.

Table 1 Climatic data of the area of the object location

No	Characteristic	Unit of measurement	Magnitude
1.	Coefficient A, depending on the temperature stratification of the atmosphere	-	200
2.	Average annual temperature	0C	+ 15,24
3.	The average temperature of the hottest month (July)	0C	+ 27,76
4.	Absolute maximum	0C	+ 42,2
5.	Average temperature of the coldest month (January)	0C	1,68
6.	Absolute minimum	0C	-19,7
7.	Average annual frequency of wind directions by direction:	%	
	N		9,83

	NNE		8,41
	NE		7,20
	ENE		4,80
	E		8,21
	ESE		3,56
	SE		4.56
	SSE		4,88
	S		7,84
	SSW		3.29
	SW		5,71
	WSW		4,91
	W		7,18
	WNW		4,77
	NW		6,50
	NNW		8,37
8.	Calm	%	25,72
9.	Precipitation	mm	376,80
10.	Wind speed (average)	m/sec	1,45
11.	Wind speed (absolute maximum)	m/sec	34
12.	The highest wind speed, the excess of which is 5%	m/sec	u*=4.06

Thus, both the physical and geographical and climatic conditions of the area under consideration contribute to the accumulation of impurities from low unorganized sources of emissions in the vital layer of the atmosphere.

The snow cover is unstable; it forms and thaws repeatedly during the winter. Only in some years can stable snow cover be observed for at least a month in a row. During the winter, the number of days with snow cover averages 30 days. The average height of the snow cover is 8-12 cm.

In spring, 30% of the annual precipitation falls, mainly in the form of rain, less often in the form of snow (in March), and there are frosts at night.

The area under consideration (a designated site for the construction of a combined cycle power plant with a capacity of 550 MW) is characterized during the year by: northern (8.83%); northeastern (7.20%); eastern (8.21%); western (7.18%); southwestern (5.71%); northwest (6.50%) winds.

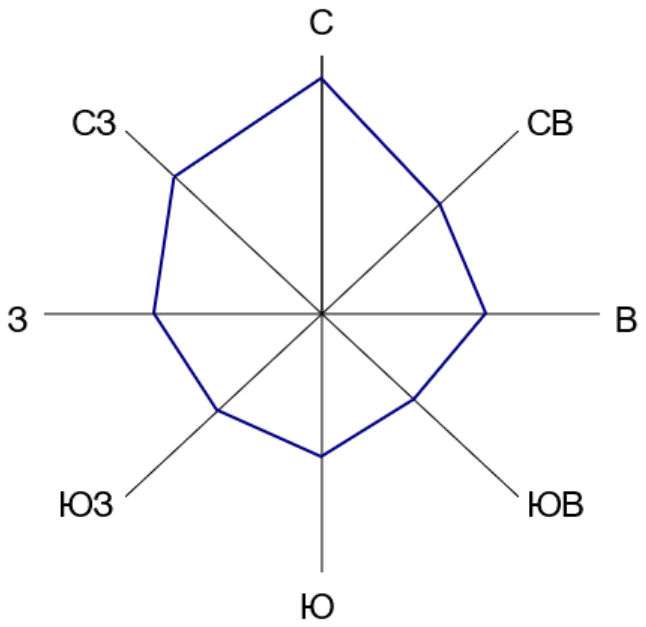


Figure 1 Frequency of wind direction (wind rose Jizzakh city), %

6.2 Relief and engineering-geological conditions

According to the geomorphological structure, the grounds are represented by loess-like loams, with layers of lenses of sand and gravel with a thickness of 2 to 40 m. Below are water-saturated pebbles.

Lithological characteristics of sediments. The quaternary deposits of the Hungry Steppe are divided into four complexes: Sokhsky (or Nanai), Tashkent, Golodnostep, Syrdarya. The total thickness of the Quaternary deposits varies from 100 m (in the west) and up to 1 000 m in the eastern part of the Hungry Steppe. In the middle part of the Hungry Steppe, quaternary deposits are characterized by a thickness of 200-300 m.

The most ancient horizon of the anthropogenic (Q1) is the Sokh (Nanai), whose deposits are represented on the plain by loams, clays (reddish tone) and sandy loams, and in the foothills by pebbles, densely cemented conglomerates, overlain by loess (possibly later).

In the foothills of the Turkestan Range, Q1 sediments correspond to alignment surfaces with heights of more than 1000 m.

The average anthropogenic (Q2) is represented by sediments of the Tashkent complex lying on the blurred surface of the Sokha sediments. Its capacity is from 100 to 220 m. Within the proper foothill plain of the Jizzakh steppe, the surface corresponding to Q2 in the form of washed remnants can be traced along the foothills, as well as within the Sanzar and Zaamin cones.

Sediments of the Hungry Steppe period (Q3) are represented by loess-like loams with a thickness of 5 to 40 m, lying in the northern part of the Hungry Steppe on the alluvial sands of the Syrdarya, and in the southern part - on pebbles, sands, loams of alluvial cones of the Sanzara, Zaamina and other rivers. Sediments of the Hungry Steppe cycle compose most of the Hungry Steppe plain.

These sediments are also found in the foothills in river valleys. Apparently, the lowest step of the foothills, composed of pebbles and covered with loess, corresponds to this age. The modern (Syrdarya) complex of quaternary deposits (Q4) can be traced in the Syrdarya valley and is represented by deposits of the second (lake), first terrace and floodplain of the Syrdarya River. Within the actual piedmont Hungry Steppe piedmont plain, the Syrdarya complex is represented by proluvial pebbles and sandy-loamy deposits of modern alluvial fans and log-like depressions. In some areas, especially on the periphery of the Sanzar cone,

on the lands adjacent to Arnasai, sands of Aeolian origin are widespread.

As part of the field geotechnical work, two wells with a depth of 50 and 30 meters were opened and core drilling was carried out. The groundwater level was found at -1.60 m.

BH-1 during drilling, the topsoil was deposited at a depth of approximately 0.00-0.50 m, and alluvium between 0.50-50.0 m was presented as a fine-grained clay-silt-sand block with high clay content in some places . In some places, the increased density of silt has passed into the ground.

BH-2 during drilling, the vegetative soil was passed to a depth of about 0.00-0.50 m, and a fine-grained clay-silt-sand block with a high clay content in places and an increased silt density in places was passed.

6.3 Surface water

The closest surface watercourse to the designated site for the construction of the power plant is the irrigation canal (figure 2), which flows at a distance of 11.5 meters in an easterly direction with a throughput of 20 to 25 cubic meters of water per second and a total depth of 4 meters along the edge of the normal water level.

Figure 2 Main irrigation canal

The main irrigation canal flows at a distance of 880 meters in the south-west direction with a throughput of 40 to 50 cubic meters of water per second and a total depth of 6 meters along the edge of the normal water level

The main irrigation canal originates from the Jizzakh reservoir, then flows near Jizzakh city in the direction of the agricultural fields of Yangikishlak village and others.

The coastal zone of the Jizzakh reservoir is located in the southern direction from the studied territory at a distance of 1.7 km.

The area of the Jizzakh reservoir (Figure 3) is 12.7 sq.m2, depth 26 m, water volume 87.5 million m3, the widest part is 5.1 km. Water is mainly collected from the “Sangzor” river into the reservoir at a rate of about 10 m3/sec. The reservoir supplies water to more than 15 thousand hectares of land in Jizzakh region. During the irrigation season, water from the reservoir is supplied through the drainage system back to the irrigation canal.

Figure 3 Jizzakh reservoir

The main sources of surface runoff formation in Jizzakh region are the Sanzar and Zaaminsu rivers.

The main high-water artery of the Jizzakh region, the Sanzar River (Figure 4), flows at a distance of 2.6 km to the west of the territory under consideration. The sources of the river are located approximately at an altitude of 3300 m, on the northern slope of the Chumkar-tau ridge. The large lateral tributaries Yelkoyday, Korangul, Karangibulak, Nauka and Zagor only carry water to the main channel during the period of snowmelt and precipitation. Sanzar river flows through the territory of the Bakhmali, Gallaaral and Jizzakh districts.

Figure 3Sanzar River

Sanzar River, with a total length of 123 km (from the sources to the Kli village), has a catchment area of 2.6 thousand km2. Sanzar River is fed by infiltration of atmospheric

sedimentation and waters of surface watercourses flowing down from the mountains, belongs to the snow-rain type. The average annual water consumption is 6.9 m3/sec. The maximum water consumption is observed in the spring and summer months, ranging from 7.36 m3/sec in August to 2.94 m3/sec in January.

6.4 Groundwater

Shallow groundwater lies at a depth of 1.5-3 m in the study area; in the project area, groundwater lies at a depth of 1.6 m. Groundwater supply occurs due to infiltration of irrigation water and precipitation. Groundwater has a high concentration of total organic and inorganic compounds and is salty, which makes it unsuitable for use in concrete production or for safe consumption.

The hydrology of Jizzakh city is represented mainly by networks of built canals and collectors that carry water from the mountains, wastewater from treatment plants, enterprises, as well as precipitation. The system of artificial channels transformed the surface hydrology of the region, which led to the appearance of Lake Aydarkul, which is located along the northern border of the region.

Aquifers of groundwater are filled due to losses due to infiltration of precipitation, mountain streams and irrigation channels.

In Jizzakh region, groundwater in a flat area is close to the surface, the depth of groundwater does not exceed 3-4 m. Groundwater mineralizes, coming to the surface, causing salinization of the soil. With increasing elevation, the depth of groundwater increases, in the foothills and plains it is 10-25 m, while the degree of salinity decreases. Groundwater in mountainous areas is associated with river valleys and is shallow (4-5 m), has high taste characteristics.

In general, the situation with groundwater quality in the region is favorable, where the content of polluting components generally does not exceed MPC levels, with the exception of the northern regions. In most of the territory of the region, there is a tendency to increase the mineralization of groundwater, remaining within the MPC. Previously detected changes in mineralization (1.15-0.05 g/l) and hardness (8.0-18.6 mg/l) were noted at a number of water intakes (Industrial Zone, Kurgan, Sarybazar, Uchtepa, Sanzarselsky, Devon). The main sources of groundwater pollution are public utilities, industrial enterprises, and sewage treatment plants.

6.5 Soil

Hungry Steppe, in the southwestern part of which Jizzakh is located, is an alluvial-proluvial plain with a general surface slope to the north and northwest. Most of the flat territory of Jizzakh region is occupied by light gray soils. In the Hungry Steppe, the light gray soils are salty, loamy and clayey in mechanical composition, while at the northern foot of the Nurata ridge they are eroded skeletal or cartilaginous and pebble-loamy soils.

Gray soils are the most widespread automorphic soils within the vertical zone, forming at relatively low altitudes of piedmont plains and, less commonly, river valleys. Light gray soils are formed on the sub-mountain sloping plains, as well as in places on the foothills and low mountains, depending on the latitudinal position and exposure of the slopes of the main ridges.

Gray soils develop mainly on loose rocks of quaternary age - loess, on loess-like, but less sorted and thin sediments, and very rarely on eluvium bedrock. The humus horizon with a thickness of 12-15 cm contains 1-1.5% of humus. The humus poverty of gray soils is explained by the insignificant intake of organic residues and their rapid mineralization. Light gray soils, in comparison with other soils of high-altitude zones, are the lightest in terms of mechanical composition and poor in organic matter content.

The total nitrogen content in gray soils is low due to their low humus content. The

arable horizon of cultivated soils contains only 0.05-0.09% nitrogen.

In the process of developing the Hungry Steppe, irrigated gray soils were formed as a result of tillage, washing, and irrigation. They differ from the virgin ones by the greater thickness of the humus horizon and the deeper position of the carbonate and gypsum horizons.

The resulting agroirrigation horizon is characterized by a uniform mechanical composition, most often heavy loamy or light loamy, monotonous grayish color and uniform humus content. High carbonate content and alkaline reaction promotes the transition of phosphorus into hard-to-digest forms. In addition, light gray soils are subjected to secondary salinization during irrigation. The main causes of salinization are associated with unsatisfactory drainage due to the lack of an optimal collector-drainage network, insufficient leaching and agrotechnical measures, and evaporation of filtered water.

Since the area under consideration is a fairly developed agricultural area, it is necessary to take into account the contamination of irrigated soils with pesticides. According to the average data from 2000 to 2006, soil contamination with pesticides in Jizzakh region amounted to 0.04 mg/kg (slightly contaminated). This is a favorable factor for the further development of agriculture in the region.

Thus, the condition of the soil in the area of the planned location of the power plant should be considered satisfactory in terms of the nature and degree of uncertainty and pollution.

The soils of the allocated area for the construction of a combined cycle power plant with a capacity of 550 MW are characterized by transitional hydromorphic soils, where meadow-gray grassy soils predominate, as well as saline soils.

Some areas of the soil cover of the land allocated for the construction of the power plant are formed on grassy loess and loess loams, they are also distinguished by the greater thickness of the humus horizon and the deeper position of the carbonate horizons.

The soil of the selected area is characterized by a uniform mechanical composition, most often loamy or light loamy, a monotonous grayish color and a uniform humus content.

Thus, the condition of the soils in the area of the planned location of the combined cycle power plant with a capacity of 550 MW should be considered satisfactory in terms of the nature and degree of unsolved conditions and pollution.

6.6 Vegetable world

In order to collect initial data to determine the potential impacts of the project on the flora in accordance with the requirements of PS-1 and PS-6 of the IFC, as well as the norms of the Laws of the Republic of Uzbekistan “On Nature Conservation”, “On Environmental Expertise”, zoological research was carried out in the area of the planned activity in May 2024.

As part of botanical research, a review of literature data on the flora and vegetation of the Jizzakh region was carried out, a brief description of the main types of plant communities, a list of plant species in the Project region listed in the Red Book of Uzbekistan and the IUCN, endemics, as well as a brief description of their ecology was determined, the locations of threatened plant species were established, and the state of populations was assessed.

When describing and mapping types of habitats (biotopes), assessing the state of the flora of the study area, natural and transformed habitats were identified in accordance with the requirements of clauses 9-15 of PS-6 of the IFC.

The data from field studies conducted in May 2024 served as a material for assessing the current state of the fauna of the area of the planned activity.

According to literary and herbarium data, there are no populations of rare species listed in the Red Book of Uzbekistan in the Project Area. The following 9 plant species listed

in the National Red Book have been noted within the Jizzakh part of Mirzachul and in the foothills of the Malguzar ridge, but all their known locations are located far from the construction site.

During a field survey in May 2024, it was determined that the Project Area contains only converted habitats that, according to the IUCN Habitats Classification Scheme (Version 3.1), belong to type 14 Artificial – Terrestrial (Anthropogenic terrestrial habitats), subtypes 14.1 Arable Land, 14.2 Pastureland and 14.4 Rural Gardens and type 15 Artificial – Aquatic, subtype 15.9 Canals and Drainage Channels, Ditches. There are no natural habitats in the Project area. At the time of the survey, construction work was underway on the site, and vegetation had already been destroyed throughout the western half of the site, and several dirt roads run through the central and eastern parts, along which heavy machinery continuously moves.

5 geobotanical test sites were described, including 2 on the site allocated for the construction of a combined cycle power plant, and 3 sites in the 300 m zone. The entire construction site is an old deposit with secondary amber-grass vegetation (Hordeum murinum ssp. leporinum, Cynodon dactylon, Alhagi pseudalhagi) and single comb bushes (Figure 1). The remains of arable land furrows are clearly visible both on the satellite image and on the ground. Converted habitat, which according to the IUCN Habitats Classification Scheme (Version 3.1) belongs to type 14 Artificial – Terrestrial, subtype 14.1 Arable Land, and according to the European classification EUNIS Habitat Classification Scheme, this habitat belongs to type V Vegetated man-made habitats and subtype V38 Dry perennial anthropogenic herbaceous vegetation.

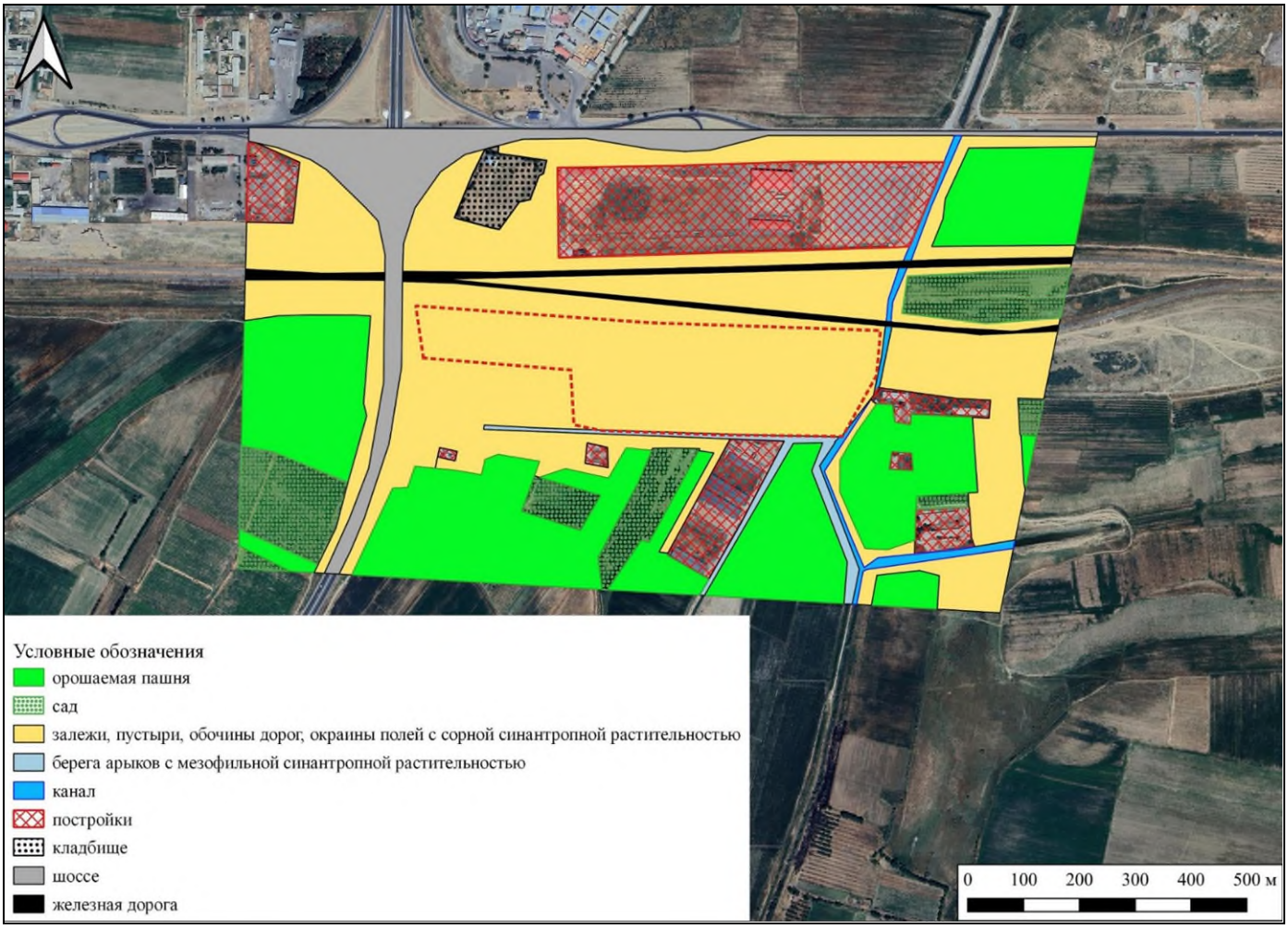


Figure 4 Habitat map of the Project area. The red dotted line is the boundary of the power plant construction site

In total, 68 plant species from 26 families were identified in the study area, of which 26 are weedy synanthropic species (including 6 adventitious), 5 are cultivated (including both

introduced and cultivated local species). Rare species listed in the Red Book of Uzbekistan or the IUCN Red List, as well as quarantine weeds included in the national list of quarantine objects, have not been found.

As a result of botanical research, it was established that the landscapes and vegetation cover of the Project area were completely transformed as a result of human economic activity, and the territory contains transformed habitats (agricultural irrigated lands, residential buildings, farms, infrastructure) with communities of cultural and weed synanthropic vegetation. There are no natural biotopes in the Project area. The species composition of the plants of the Project area is represented by species widely distributed in the developed plains and foothill regions of Uzbekistan. A significant proportion in the species composition and a high abundance in the vegetation cover of synanthropic, weedy plants, including adventitious ones, is an indicator of the anthropogenic transformation of the ecosystems of the studied territory. The survey showed that there are no vulnerable rare and endemic plant species and critical habitats in the Project area that meet the criteria set out in the Performance Standard 6 of IFC.

6.7 Animal world

6.7.1 Terrestrial wildlife

The fauna of the region is represented by desert species that have adapted well to the natural conditions of the Hungry Steppe. The fauna of this region is not very diverse. The fauna of reptiles includes about 21 species. A typical representative is the steppe turtle. Lizards are the most numerous. On the mountain slopes and the foothill plain there are 6 species of geckos: pink and gray geckos, shelled gecko; 3 species of roundheads: takyrnaya, sandy and long-eared roundheads; 4 species of lizards: fast, linear, medium and reticulated; steppe agama. There are spotted skids, sand boa constrictor, snake arrow.

Most of the region (the northeastern part, the southwestern part) is inhabited by animals that have adapted to anthropogenic conditions. Rodents include jerboa, ground squirrels, turtles, lizards and snakes. In sparsely populated areas, predatory animals are found - wolf, fox, badger.

There are no special zones dedicated to the conservation of biodiversity within the lands of the allocated territory.

The fauna of the Sh. Rashidov district is represented here by reptiles (foot-and-mouth disease, mice, rats) and birds (mynah, sparrow, pigeons, etc.), which have adapted to anthropogenic conditions.

There are no Red Book representatives of the fauna in the described territory.

6.8 Territories with special conditions of use

6.8.1 Specially protected areas

Based on the results of a preliminary environmental and social assessment based on literature data, it was found that there are no specially protected areas of state, regional or local significance in the Sharaf Rashidov district (report 125-1105-SR).

Protected natural areas, Key Biodiversity Areas, including key bird areas and wetland ecosystems included in the Ramsar list, as well as areas included in the UNESCO World Natural Heritage Sites, are located at a significant distance from the site of the combined-cycle power plant. In particular, the protected natural territories of the Jizzakh region include the Zaamin Reserve and the Zaamin National Park (part of KBA UZB 20 Northern slope of Turkestan Mountains), which are located 50–51 km southeast of the Project area on the northern slope of the Turkestan ridge, the Nurata Nature Reserve, which is located 95 km west of the Project area in the central part of the ridge. Nuratau (part of KBA UZB 24 Nuratau Ridge), and the Arnasay ornithological reserve, located 53 km northwest of the construction site on Lake Tuzkan (key bird area IBA UZ 35 and part of the Aydar-Arnasay lake system

included in the Ramsar list). At the moment, the list of UNESCO World Natural Heritage Sites within the transboundary territory “Western Tien Shan” (Kazakhstan, Kyrgyzstan, Uzbekistan) includes the mountainous part of the Tashkent region, and the transboundary territory “Turan Deserts of the Temperate Zone” (Kazakhstan, Turkmenistan, Uzbekistan) includes the Uzbek part of the Ustyurt Plateau. Both of these facilities are located at a considerable distance from the Project Area.

6.8.2 Critical habitats

According to clause 16 of PS-6 of IFC, critical habitats include habitats:

i) significant habitats of critically endangered and/or threatened species (this includes species included in the IUCN Red List with CR or EN status, as well as species included in national/regional red lists based on criteria similar to those of the IUCN). In the note to clause 16 of the IFC PS-6, it is noted that in cases where the classification of species in national or regional lists does not fully coincide with the IUCN classification, an assessment should be carried out, which will serve as the basis for determining the critical habitat;

ii) significant habitats of endemic species and/or species with a limited range;

(iii) habitats supporting globally significant concentrations of migratory species and/or gregarious species;

(iv) threatened and/or unique ecosystems;

v) territories associated with the most important evolutionary processes.

Quantitative criteria are defined for the first 4 categories of critical habitats, i.e. threatened, endemic and migratory species and threatened/unique ecosystems), these criteria are based on the IUCN methodology published in “IUCN Red List Categories and Criteria”(2012), “A Global Standard for the Identification of Key Biodiversity Areas”(2016), “Guidelines for the application of IUCN Red List of Ecosystems Categories and Criteria” (2016) and “Guidelines for using A Global Standard for the Identification of Key Biodiversity Areas” (2020). In particular, according to the requirements of “A Global Standard for the Identification of Key Biodiversity Areas” (2016), for identification as a key biodiversity area based on the criterion of the presence of threatened species, the territory must be home to at least 0.5% of the world population of species of categories CR and EN (but not less than 5 reproductive individuals) and at least 1% of the population of species of category VU (but not less than 10 reproductive individuals). Regarding the criterion for the presence of endemic and/or narrowly distributed species, KBA standards require the presence of at least 10% of the global population of the species (but not less than 10 reproductive individuals) in the territory. Quantitative assessment can be carried out both by the parameter of the number of reproductive individuals, and by the habitat area, the area of the range to which the species is confined, or the number of locations. For threatened and/or unique ecosystems, the standards of key biodiversity areas require at least 20% of the global area of this type of ecosystem.

According to the results of survey of flora and fauna conducted in May 2024, habitats that meet the criteria of PS-6 of the IFC were identified in the area of project activity.

6.9 Environmental assessment

6.9.1 Atmospheric air quality

To obtain up-to-date and reliable information on the level of chemical pollution of the atmosphere in the area where the combined cycle power plant is located, monitoring of chemical pollution of the atmospheric air was carried out.

At the end of April 2024, an air quality study using the Zephyr sensor in the area of the planned activity began. This chapter includes data obtained at three monitoring points that show the concentration of pollutants in the atmosphere. Currently, research is

ongoing, and the 4th monitoring point has been accepted for consideration, next to a public landfill at a distance of about 1000 meters from the project area. The results of the studies will be taken into account in the project documentation and, if necessary, will be used as the basis for action plans to reduce environmental and social impacts.

The scope of baseline studies includes monitoring of chemical pollution of atmospheric air with Zephyr sensor (4 points), arranged in order of priority of observations.

The Zephyr sensor allows you to determine atmospheric concentrations of nitrogen dioxide (NO2), nitrogen oxide (NO), sulfur dioxide (SO2), carbon oxide (CO), suspended particles PM 1, PM 2.5 and suspended particles PM 10.

The duration of studies with the Zephyr sensor is 20 days of continuous monitoring at each of the 3 points, at the 4th point the monitoring period will be 14 days.

6.9.1.1 Atmospheric air quality studies using the Zephyr sensor

In the area of the planned activity, monitoring began on 22.04.2024 to collect information on the baseline conditions of chemical pollution of atmospheric air using the Zephyr compact air quality monitor.

Data from the Zephyr sensor was transmitted on-line to a cloud resource https://portal.earthsense.co.uk/. The list of points where the Zephyr sensor studies were performed is shown in Table 2.

Table 2 Monitoring points, Zephyr sensor

Point No	Place of conducting observations	Geographical coordinates of the point	
1	Residential development near the construction site	40° 5’25.18"N	67°56’45.57"W
2.	Gas distribution station near the construction site	40° 5’25.99"N	67°56’25.02"W
3	Cemetery behind the railway line	40° 5’38.85"N	67°56’27.38"W
4	Garbage dump outside the project area	40° 5’47.22"N	67°57’19.47"W

Schematic map of the Zephyr sensor monitoring points is shown in Figure 6.

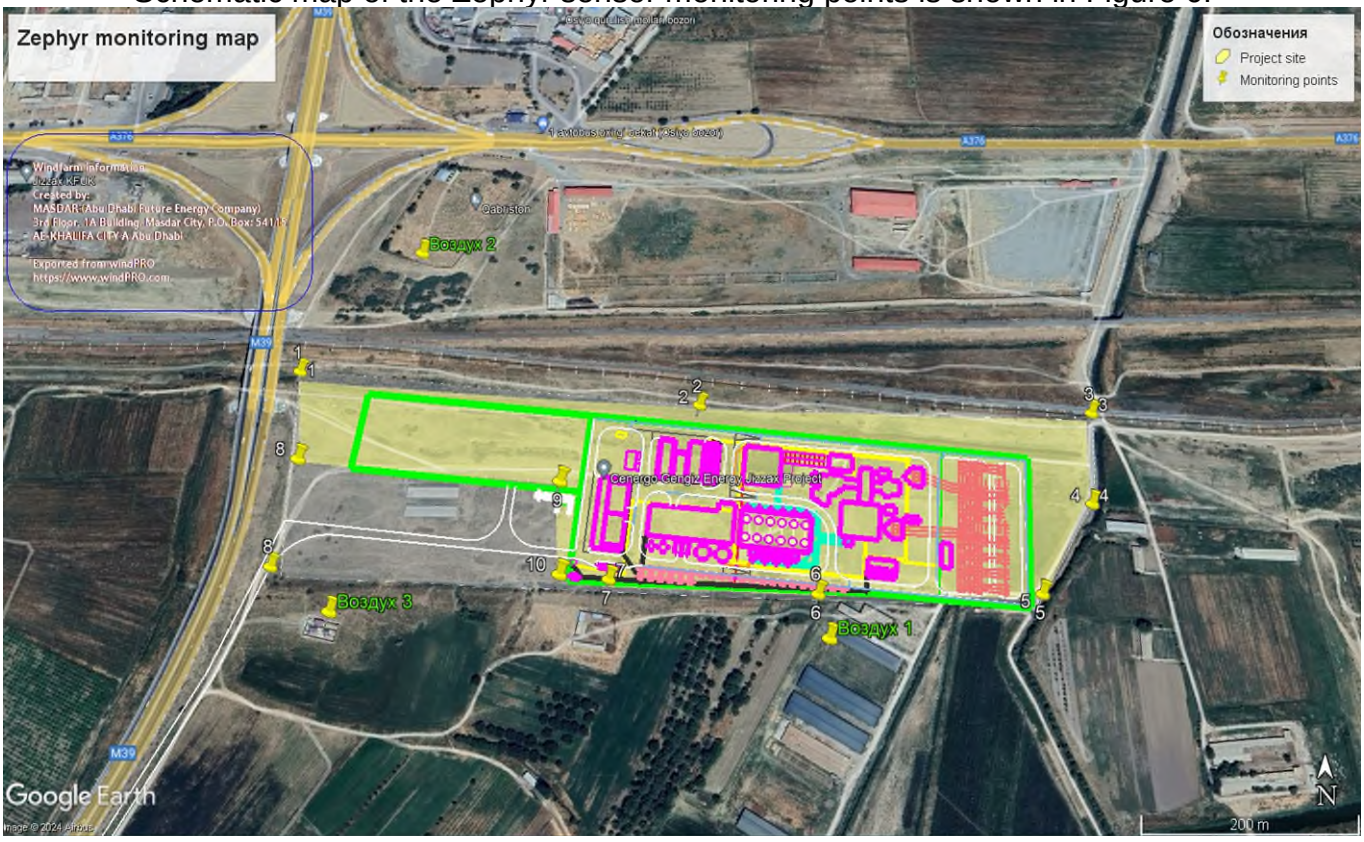


Figure 5 Schematic map of the location of monitoring points using the Zephyr Sensor

An analysis of the results of monitoring atmospheric pollution with the Zephyr sensor showed the following:

1. Single exceedances of the maximum single MPC of pollutants established by national requirements have been recorded.
2. After the monitoring is completed at the last monitoring point, the information in this section will be updated.

6.9.2 Physical factors

6.9.2.1 Noise

To determine the baseline acoustic situation in the project area, including assessing the compliance of noise impact with hygienic standards in residential areas and determining the requirements for noise protection measures in buildings and areas with standardized levels of noise impact, as part of baseline studies, acoustic measurements were carried out, the results of which are summarized in report 125-1105-Bio.

Taking into account the planning situation, the following points are selected for studies of noise, vibration and infrasound levels, indicated in Table 3.

Table 3 Noise Control Points

No	Place of observation	Coordinates
1.	Point No. 1 Entrance to the construction site	40.092745 67.939482
2.	Point No. 2 End of the construction site near the canal	40.091163 67.948810
3.	Point No. 3 (near residential development)	40.090561 67.946963
4.	Point No. 4 the central part of the construction site	40.090727 67.944903
5.	Point No. 5 near the gas station	40.090877 67.940344

5 points have been selected for research in the project area (Figure 7).

Figure 6 Schematic map of acoustic measurement points

Noise measurements were performed in accordance with the methodology of GOST 23337-2014 “Noise Methods for measuring noise in the residential area in residential and public buildings”.

Vibration measurements are performed in accordance with GOST R 53964-2010 “Vibration. Vibration measurements of structures”.

Infrasound measurements were performed in accordance with MI PKF-14-016 Methodology for measuring sound pressure levels in the infrasound frequency range at workplaces in industrial premises and on the territory.

Measurement schedule is presented in Table 4.

Table 4 Graph of measurements

Point No	Place of conducting observations	Measurements	Frequency of observation
1.	Point No. 1 Entrance to the construction site	Infrasound, noise	2 times, during the day (from 7.00 to 23.00), at night (from 23.00 to 07.00)
2.	Point No. 2 End of the construction site near the canal	Infrasound, noise	2 times, during the day (from 7.00 to 23.00), at night (from 23.00 to 07.00)
3.	Point No. 3 (near residential development)	Infrasound, noise, vibration	2 times, during the day (from 7.00 to 23.00), at night (from 23.00 to 07.00)
4.	Point No. 4 the central part of the construction site	Infrasound, noise	2 times, during the day (from 7.00 to 23.00), at night (from 23.00 to 07.00)
5.	Point No. 5 near the gas station	Infrasound, noise, vibration	2 times, during the day (from 7.00 to 23.00), at night (from 23.00 to 07.00)

As a result of measurements, it was established:

1. Sound pressure levels in octave frequency bands, the sound level, do not exceed the permissible levels established in SanR&N 0008-20 “Sanitary norms and rules for ensuring permissible noise in residential and public buildings, in residential areas and public recreation areas”
2. The general level of infrasound and the levels of infrasound pressure in the octave frequency bands do not exceed the maximum permissible levels established for the territories directly adjacent to residential buildings
3. Vibration levels in the octave frequency bands in a residential area do not exceed acceptable values.
4. The sound pressure levels at the measuring points comply with international requirements:

- International Finance Corporation. World Bank Group. Environmental Health and Safety (EHS) Guidelines. General EHS Guidelines: Environment. Noise level control. 1.7 Noise. 2007
- WHO recommendations on baseline noise in residential areas. World Health Organization. 1999

6.9.3. Surface water quality

In the course of baseline studies, a single sampling of surface waters in several reservoirs was performed:

- 1-Canal flowing next to the project area below the project area

- 2-Canal flowing next to the project area above the project area
- 3-Proposed surface water intake of the enterprise (Jizzakh reservoir)

Samples were taken in accordance with the methods of surface water sampling approved in the RUz.

Studies of surface waters included analysis of samples for the following indicators: BOD, COD, dissolved oxygen, chromium, copper, iron, mercury, lead, calcium, magnesium, manganese, nickel, vanadium, zinc, pH, total hardness, alkalinity, sulfates (water-soluble), phosphates, ammonium nitrogen, chlorides, nitrates, nitrites, dry residue, cyanides, fluorides, total content of petroleum hydrocarbons (petroleum products), benzo(a)pyrene, total phenols, suspended solids, total mineralization).

Detailed results of surface water studies are presented in Report 125-1105-BIO.

As a result of the quantitative chemical study of surface waters, the following features were revealed - exceeding the target indicator.[1]

Chrome – exceeding the target was noted for all 3 samples.

Manganese - exceeding the target was noted for samples No. 1,3,

Copper - exceeding the target value was noted for samples 2.3.

Magnesium- exceeding the target was noted for all 3 samples.

Mercury - exceeding the target was noted for samples No. 2 and No. 3.

Lead - exceeding the target was noted for samples No. 1, No. 2 and No. 3.

Nickel - exceeding the target was noted for sample No. 1.

Thus, for surface waters, a minor anthropogenic impact associated with the discharge of untreated wastewater into an irrigation canal was revealed.

Elevated concentrations of other indicators are most likely associated with natural factors.

It is also necessary to take into account the impact of irrigation channels after land flushing: the channel next to the project area is used for irrigation of agricultural land.

6.9.4 Groundwater quality

During the baseline studies in April-May 2024, a single sampling of groundwater was carried out, groundwater wells in the project area and a groundwater well in a private house near the project area.

Studies of groundwater to determine the level of its pollution included the sampling of groundwater and their subsequent analysis for the following indicators: BOD, COD, dissolved oxygen, chromium, copper, iron, mercury, lead, calcium, magnesium, manganese, nickel, vanadium, zinc, pH, total hardness, alkalinity, sulfates (water-soluble), phosphates, ammonium nitrogen, chlorides, nitrates, nitrites, dry residue, cyanides, fluorides, total content of petroleum hydrocarbons (petroleum products), benzo(a)pyrene, total phenols, suspended solids, total mineralization).

As a result of the quantitative chemical study of underground (ground) waters, the following features were revealed – exceeding the target indicator.

Chrome – exceeding the target was noted for all 2 samples.

Manganese - exceeding the target was noted for sample No. 5

3 [1] The target indicator is the lowest permissible concentration of the indicator, depending on the category of water use (household-drinking, irrigation, cultural, household, fisheries), for more information, see the report for more information, see report 125-1105-BIO.

Copper - exceeding the target was noted for samples 5.

Magnesium- exceeding the target was noted for all 2 samples.

Nickel - exceeding the target was noted for samples No. 4 and No. 5.

Thus, technogenic effects have been revealed for groundwater – targets have been exceeded. The increased concentrations of the remaining indicators are most likely due to natural factors and the impact of intensive agricultural production.

6.9.5 Soils

To assess the potential impact of the planned activity on soils and grounds, a quantitative chemical analysis of soils and parent rocks (grounds) was carried out as part of the baseline studies.2

In total, 4 samples were taken from the upper genetic soil horizon on test plots 10*10 m. The assessment of the state of soils (grounds) was carried out taking into account the standards of the Republic of Uzbekistan, and the soil quality criteria given in the Soil Remediation Circular (2013).

Sampling was performed in the following locations:

- end of the construction site, grass cover (sample S01);
- beginning of the construction site, grass cover (sample S02);
- green area next to dilapidated buildings behind the construction site (sample S03).
- green area next to the planned power plant (sample S04)

Sampling was carried out on the basis of the current regulatory and technical documents, in accordance with the established norms and rules for the relevant types of work.

The Central Laboratory of “Uzbek Geological Exploration” JSC is a certified, accredited laboratory. The quality of the performed analyses is ensured:

- compliance with the requirements of the quality system procedures for working with samples, managing documentation, measuring instruments, standards, etc.;
- periodic state metrological verification of measuring instruments;
- using standards and certified comparison samples

The results of soil and ground testing showed that the content of copper, nickel, lead, zinc, chromium, and cadmium exceeds the MPC established in the RUz for mobile forms of metals.

At the same time, it should be noted that soil quality indicators for mobile forms of metals are focused on the assessment of pollutants that form the risks of translocation effects (first of all, risks in the production of agricultural products used to feed the population).

From this point of view, as well as taking into account the industrial purpose of the construction site, recommendations on the levels of Soil Remediation Circular intervention (2013), there are no restrictions for the project related to soil contamination. Nevertheless, when preparing proposals for monitoring environmental components and action plans, it is advisable to provide for the assessment of the soil condition of recreational facilities located in the area of the planned activity and/or on the border of the SPZ of the power plant.

It is worth noting that, conditionally, the baseline sampling site (S-4) is a green zone next to the construction site, in most cases, the degree of pollution is lower than the pollution

4 [2] For more information, see Report 125-1105-BIO.

level of the construction site of power plants. Exceedances are noted for two components (nickel and zinc)

MPC levels of petroleum products, mercury and arsenic in soils and grounds were not exceeded at any of the test sites.

7 SOCIO-ECONOMIC CONDITIONS

7.1 Republican and regional context

Uzbekistan – the most populous republic in Central Asia. Covering an area of 447,000 km2, Uzbekistan is the only Central Asian republic that borders all four other States of this group.

Jizzakh region is located in the central part of Uzbekistan between the Syrdarya and Zeravshan rivers. It borders the Republic of Kazakhstan and the Syrdarya region in the north, the Republic of Tajikistan in the southeast, and the Navoi and Samarkand regions in the west. The area of the region is 21.21 thousand km². The administrative center is Jizzakh city.

Administrative-territorial, Jizzakh region is divided into 12 districts. There are 6 cities, 8 urban-type settlements and 100 rural settlements in the region.

Administrative division of the Jizzakh region is presented in Table 5 and Figure 8.

Table5 Administrative districts of Jizzakh region

Item	District name	Administrative center
1.	Arnasay	Goliblar
2.	Bakhmal	Usmat
3.	Dustlik	Dustlik
4.	Farish	Yangikishlak
5.	Gallaaralian	Galliaral
6.	Sharaf-Rashidov	Uchtepa
7.	Mirzachul	Gagarin
8.	Pakhtakor	Pakhtakor
9.	Yangiabad	Balandchakir
10.	Zaamin	Zaamin
11.	Zafarabad	Zafarabad
12.	Zarbdar.	Zarbdar

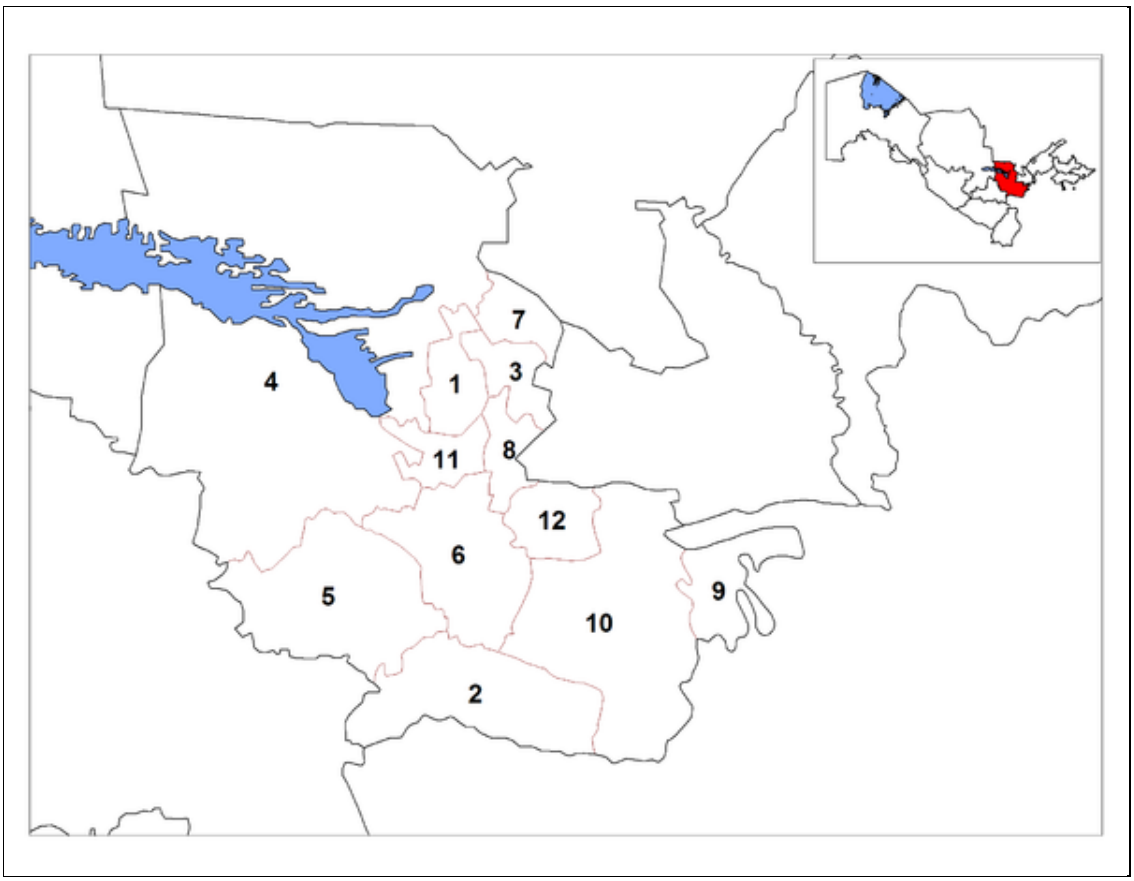


Figure 7 Administrative districts of the Jizzakh region

The construction site is located in Sharaf Rashidov district, in the immediate vicinity of Jizzakh city.

Source: https://stat.uz/ru

The socio-economic indicators of the Jizzakh region are presented in Table 6. *Socio-economic indicators of the Jizzakh region*

Table 6 Socio-economic indicators of Jizzakh region

Name		Indicators
Territory, km 2		21,178
Population		
Population density, people / km2		62.5
Total number of people		1 507 400
Women, people		768 774
Men, people		738 626
Urban population, people		707 300
Rural population, people		800 100
Educational institutions		
Primary schools		585
Secondary vocational institutions (colleges)		7
Academic lyceums		14
Higher educational institutions		2
Medical institutions		
Hospitals		32
Government clinics		9
Infrastructure, km		
Transport	Highways	1,965

	Railways	391
	Airport	-

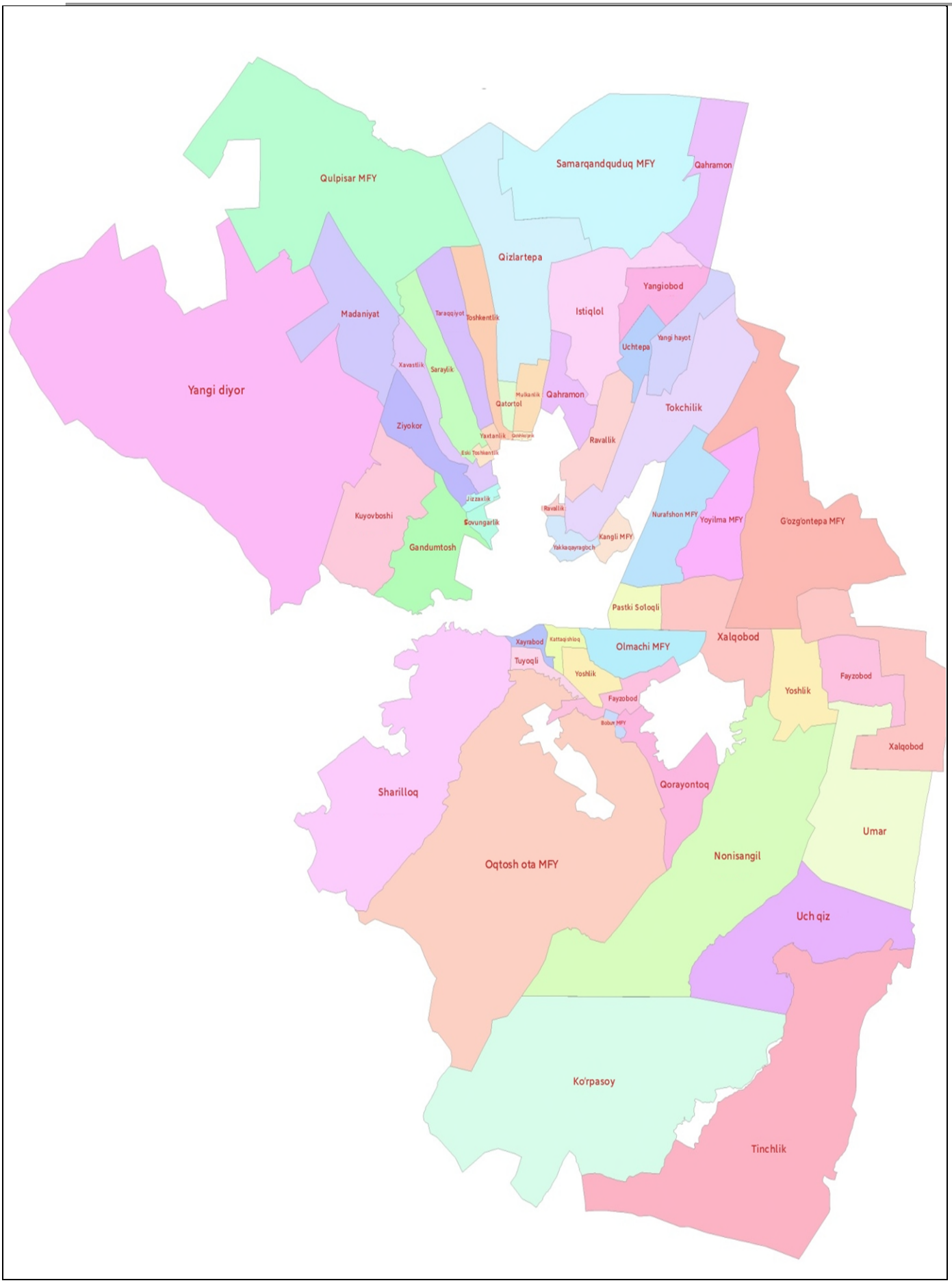
https://stat.uz/ruSource: https://stat.uz/ru

The construction site is located in the Jizzakh region, in Sharaf-Rashidov district, in the immediate vicinity of Jizzakh city.

Sharaf-Rashidov district covers an area of 1.32 thousand km2

The region borders on the Farish, Zafarabad, Pakhtakor, Zarbdor, Zaamin, Bakhmal and Gallyaaral regions.

There are 39 settlements in Sharaf-Rashidov district, 48 makhalla councils, 243.1 thousand people live on January 1, 2024 (Figure 9 Makhallas of Sharaf-Rashidov district).



Figures8Makhallas of Sharaf-Rashidov district

7.2 Demographic characteristics

According to data for April 2024, 37 003 347 people live in Uzbekistan. Since 2016, the country's population has increased by more than 10%, mainly due to natural growth, although the republic has maintained a negative migration balance over the past 20 years. Approximately 50.1% of the population lives in cities. On average, a family in Uzbekistan consists of five people. The average age of Uzbek residents is 27.8 years.13 (Figure 10).

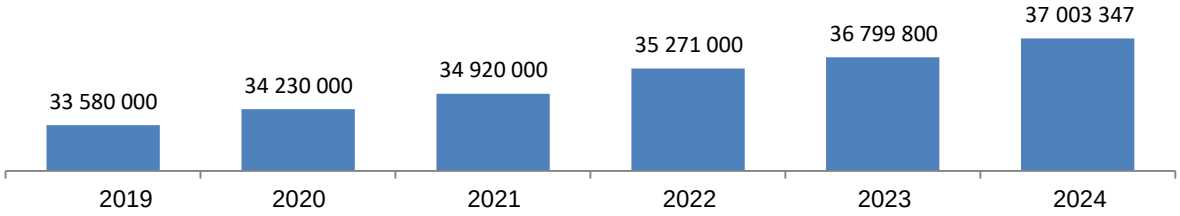


Figure9 Population of Uzbekistan as of the beginning of the year, people.

https://stat.uz/ruSource: https://stat.uz/ru

There are 1 507 400 people living in Jizzakh region (beginning of 2024), with 47% of the population being urban residents. The population in Jizzakh city is growing and at the beginning of 2024 reached 165 036 people.

According to the data, on January 1, 2024, the number of permanent residents of Sharaf-Rashidov district is 243.1 thousand people, and the increase compared to the previous year is 6.3 thousand people or 2.7%.

Table 7 Number of permanent residents (As of January 1, 2024, thousand people)

Name	**Total number of the population**	**Including:**	
		men	**women**
Jizzakh region.	1,507.4	760,6	746,8
Sh.Rashidov district	243,1	123,1	120,0

Figure 11 The ratio of men and women in the number of permanent residents of the district (January 1, 2024, in %)

Thus, as of January 1, 2024, 50.6% of the permanent population of the district is male, and 49.4% is female. Based on this, it is possible to observe the predominance of the male population over the female one.

Table 8Natural population movement for the period January-December 2023

Name	Ppl.			In relation to 1000 people.	
	2022 y.	2023 y.	increase, decrease	2022 y.	2023 y.
Birth rate	6,678	7 275	597	28.6	30,3
Mortality rate	861	1,141	280	3,7	4.8
Natural growth	5,817	6,134	317	24,9	25,6
Marriage	1,988	1,830	-158	8.5	7,6
Divorced	248	265	17	1,1	1,1

Birth rate. The number of births in the district for the period January-December 2023 amounted to 7,275 people, and compared to the same period of the previous year (6,678 people) increased by 597 people. Accordingly, the fertility rate is 30.3 ppm, and compared to the same period last year (28.6 ppm) increased by 1.7 ppm.

Mortality rate. The number of deaths in the district for the period January-December 2023 amounted to 1,141 people, and compared to the same period last year (861 people), the level increased by 280 people. Accordingly, the mortality rate was 4.8 ppm, in the previous year of the same period, this coefficient was 3.7 ppm.

Natural growth. When analyzing the above table, it can be observed that the natural increase in the district for the period January-December 2023 amounted to 6,134 people, which increased by 317 people compared to the same period of the previous year.

In 2024, according to https://countrymeters.info/ru, the life expectancy of residents of Uzbekistan was estimated at 72.5 years. According to this indicator, the republic ranks 100th among 228 countries in the world. For comparison: Tajikistan ranks 113th in this ranking (life expectancy is 70.8 years), and the UK is in 22nd place (81.4 years). Life expectancy for men is 69.5 years, for women - 75.7 years.

https://stat.uz/ruSource: https://stat.uz/ru

The following makhallas are located in the area of potential social impact of the project (Figure 1-2), which are subject to potential direct and indirect impacts of the planned activities:

- Gozgontepa makhalla is located in the 2000 m zone from the project area, the total area is 61 hectares, 892 households are located on this territory. In total, 3486 people live in this makhalla, of which 1714 are women.
- Khalkobad makhalla is located 1000 m away from the project area, with a total area of 39 hectares, and 1,358 households are located on this territory. In total, 8,390 people live in this makhalla, of which 3,923 are women.
- Pastki Sukokli makhalla is located in the 2000 m zone from the project area, the total area is 52 hectares, 1088 households are located on this territory. In total, 5810 people live in this makhalla, of which 3005 are women.
- Almachi makhalla is located in the 2000 m zone from the project area, the total area is 105 hectares, 2,882 households are located on this territory. Total 7.4).

Table 9 Population of the social influence zone of the project[3].

Makhalla	Gozgontepa	Khalkobad	Pastki Sukokli	Olmachi	Total

[3] According to the makhalla passports.

Population, people	3486	8390	5810	8187	25 873
Households, units	892	1358	1275	2882	6407
Number of families, units.	586	1712	1088	1441	4827
Women, people.	1714	3923	3005	3442	12084
Men, people.	1772	4467	2805	4745	13789
Women %	49,17%	46,76%	51,72%	42,04%	46,71%
Men%	50,83%	53,24%	48,28%	57,96%	53,29%
Children under 18 years of age, ppl.	1331	2985	1989	2872	9177
Children under 18 years of age %	38,18%	35,58%	34,23%	35,08%	35,47%

Figure 10 Location of makhallas and other sensitive areas

7.3 Ethnicity, indigenous peoples, religion and language

The peoples of Turkic (Uzbeks, Kazakhs, Karakalpaks), Semitic (Bukharian Jews) and Iranian (Tajiks) origin traditionally live on the territory of Uzbekistan, as well as representatives of other peoples who arrived here during the reign of the Russian Empire and the USSR (Russians, Crimean Tatars, Meshketian Turks, Koreans and a small number of Ashkenazi Jews).

The largest ethnic group in Uzbekistan are the Uzbeks. According to an updated official estimate published in 2017, the Uzbek population is just over 26.9 million (83.8% of the country's population), and the Tajik population is 1 544 700 (4.8%).

In the period from 1991 to 2017, the share of Uzbeks increased by 11% and reached 84%, against the background of a noticeable decrease in the share of Russians (by 5.4%), Kazakhs (by 1.6%), Tatars (by 1.4%) and Ukrainians (by 0.5%) as a result of emigration of representatives of these ethnic groups (Table 10).

Table 10 Ethnic composition of the population of Uzbekistan, %

Ethnic group	1991	2017	Ethnic group	1991	2017
Uzbeks	72.8	83,8	Tatars	2,0	0.6
Karakalpaks	2.1	2,2	Turkmens	0.6	0.6
Tajiks	4.8	4.8	Koreans	0,9	0.6
Kazakhs	4.1	2.5	Ukrainians	0.7	0,2
Russians	7.7	2.3	Others	3.4	1,5
Kyrgyz	0,9	0,9			

Source: https://stat.uz/en/open-data

The Uzbek population dominates in the project area. Based on the results of the study of documents, consultations and interviews, indigenous peoples or groups (i.e. Tajiks, Kyrgyz, Tatars, Turkmens) that have a collective attachment to a geographically defined habitat, traditional lands or ancestral territories in the project area, as well as to natural resources in this habitat and in such territories have not been identified.

The state language of the Republic of Uzbekistan is the Uzbek language. The second most important language – Russian, which is spoken by a significant part of the population and which is widely used in the country. In addition to the Uzbek language, which has the status of an official state language, other languages are also used in several regions. In the Autonomous Republic of Karakalpakstan, the second official language is Karakalpak.

Consultations with representatives of local governments in the district of the planned activity (in makhallas) were held in Uzbek – the native language of the majority of representatives of the affected population groups.

The main religions in Uzbekistan – Sunni Islam, Orthodoxy and Judaism. For the republic as a whole, the distribution by confessions is as follows: Muslims – 79% (mostly Sunnis of the Hanafi madhhab; the Shiite minority does not exceed 1% and is concentrated mainly in the Bukhara and Samarkand regions), Orthodox – 4% (the share of Orthodox is decreasing, which is caused by the emigration of Russians, Ukrainians, Belarusians, etc.), other denominations of Christianity – 3% (Roman Catholics, Korean Christians, Baptists, Lutherans, Seventh Day Adventists, Evangelical Christians and Pentecostals, Jehovah's Witnesses), as well as Buddhists, Baha'is, Hare Krishnas and Atheists.

In the context of the IFC PS-7 definitions, the existing minority groups are assimilated and do not have any socio-economic or political characteristics that would distinguish them from the dominant groups living on the territory of the project implementation.

As such, the IFC PS-7 requirements for indigenous peoples are not applicable to the project and are excluded from further assessment.

7.4 Public health and healthcare system

There are 2062 hospitals in Uzbekistan (according to data for 2024), including 1497 private clinics. Since 2018, 60 new public hospitals have been opened. On average, there are 45.2 hospital beds per 10 000 inhabitants, which is less than in Russia or Kazakhstan.

There are 226 polyclinics in Jizzakh region, of which 81 are located in Jizzakh city, in Sharaf Rashidov district -20. The number of polyclinics decreased by 34 compared to 2016, despite the population growth in the region. The number of hospitals in the Jizzakh region is 55 units, of which 25 hospitals operate in Jizzakh city, and 4 in Sharaf-Rashidov district, despite the growth of the district's population.(Table 11).

As of the beginning of 2024, the degree of provision of hospitals (per 10 thousand population) in the Sharaf-Rashidov district at the rate of 243.1 thousand people amounted to 16.5%, while the provision of outpatient clinics is almost within the norm.

Table 11 Operating treatment and preventive healthcare institutions in the Sharaf-Rashidov district

Name	2020 y.	2021	2022
Sharaf Rashidov district			
Number of clinics and outpatient facilities	15	18	20
Hospital facilities (hospitals, medical centers, etc. hospitals)	6	4	4

https://stat.uz/ruSource: https://stat.uz/ru

The overall morbidity rate of the population of the Sharaf-Rashidoм district for the period 2019-2021 tended to increase by an average of 6% (Table 12).

Table 12 Classification of the main diseases of the population of Bekabad city

Name	2019 y.	2020 y.	at the beginning of 2021
Total diseases	63445	63968	67993
Some infectious and parasitic infections	2588	2507	2442
Newly formed tumors	138	171	115
Diseases of the enocrine system, digestion, metabolic disorders	1364	1034	612
Blood and hematopoietic diseases of organs and some disorders affecting the immune mechanism	13520	10510	6791
Psychological and mental disorders	58	124	127
Diseases of the nervous system	1341	2069	1633
Diseases of the eye and visual apparatus	3574	2205	4250
Ear and nasopharyngeal diseases	1996	1921	1853
Diseases of the circulatory system	732	2348	2218
Respiratory diseases	19106	18602	14543
Diseases of the digestive system	11566	12155	29145
Diseases of the urinary and reproductive system	3304	3992	3606
Complications of pregnancy, childbirth and postpartum complications	890	573	3583
Skin and skin-covering diseases	589	1097	1336
Diseases of the musculoskeletal system and connective tissue	1092	1607	2097
Congenital anamalia, deformities and chromosomal abnormalities	39	13	19

Complications associated with external cause, injury and poisoning	1409	2830	4628

https://stat.uz/ruSource: https://stat.uz/ru

In the structure of the general morbidity of the population of the region, the leading place is occupied by diseases of the digestive system (43% of cases of the total number of cases), in second place are diseases of the respiratory system (21% of cases of the total number of cases), in third place are diseases of the blood and hematopoietic diseases of the organs (16%). This is followed by injuries and poisoning (6.8%), diseases of the eye and its adnexa (6.25%), diseases of the genitourinary system (5.30%), complications of pregnancy, childbirth and postpartum complications (5.2%). Diseases of the endocrine system, mental and behavioral disorders, diseases of the skin and subcutaneous tissue, and neoplasms account for a total of 6.3%. Congenital anomalies (less than 1%), neoplasms (less than 1%), mental disorders and behavioral disorders (less than 1%) account for the smallest share in the morbidity structure.

The health of the population is in a certain relationship with the state of the environment. Environmentally determined classes of diseases serve as one of the most important criteria for assessing the quality of the environment, an indicator of its favorableness for human life.

Ecologically determined classes of diseases are able to vividly indicate the impact of the environment on the health of the population. The most sensitive to the effects of environmental factors are the hematopoietic, cardiovascular, central nervous, genitourinary systems, as well as the respiratory organs.

Based on the data presented, in the area of the planned activity, classes of diseases are more pronounced (respiratory diseases 21% and blood diseases and hematopoietic organ diseases 16%), one way or another related, among other things, to environmental conditions, in particular, the level of air pollution and the lifestyle of the population.

7.5 Education

In Uzbekistan, education includes four main levels (Table 13):

- general education training,
- vocational education,
- additional education
- advanced training.

Table 13 The education system in Uzbekistan

<table>
<tr><th>General education training</th><th>Professional education</th><th>Additional education</th><th>Advanced training</th></tr>
<tr><td>Preschool education (children aged 3-7 years)</td><td>Medium professional education (colleges and technical schools)</td><td>Additional education for children and adults</td><td rowspan="3">Vocational training is intended for people of different ages in order to develop the professional competencies necessary to perform specific labor (office) functions, including the operation of specific equipment, technologies, hardware and software and other professional tools. Such training is aimed at developing certain skills of a worker or employee (in</td></tr>
<tr><td rowspan="2">Primary general education (1-4 academic years) - compulsory
Basic general education (5-9 academic years) - compulsory</td><td>Higher education (Bachelor’s degree)</td><td>Additional professional education</td></tr>
<tr><td>Higher education (Master’s degree)</td><td></td></tr>
</table>

Secondary general education (9-11 academic year)			accordance with the requirements for a certain rank, class, category) without changing the general educational qualification.

https://stat.uz/ruSource: https://stat.uz/ru

There are 10 130 schools in the country (as of the 2021-2022 academic year), in which education is conducted in the following languages: 8 227 - Uzbek, 88 - Russian, 143 -

Kazakh, 245 - Karakalpak, 92 - Tajik, 21 - Kyrgyz, 23 - Turkmen. A total of 7 408 schools operate in rural areas.

There are 307 pre-school institutions in the Jizzakh region, and 40 in the Sharaf-Rashidov district (Table 14).

Table 14Preschool education in Sharaf-Rashidov district

District/city	2020 y.	2021	2022
Sharaf Rashidov district Number of preschool education institutions	38	37	40
Number of children in preschool institutions, people.	7532	8189	9509

https://stat.uz/ruSource: https://stat.uz/ru

There are 585 schools in the Jizzakh region, and 61 in the Sharaf-Rashidov district. The average occupancy rate of one school is 685 students, which indicates a sufficient number of schools in the district and not overcrowded classrooms (Table 15).

Table 15 Secondary education of Sharaf-Rashidov district

District/city	2019/2020 academic year	2010/2021 academic year	2021/2022 academic year
Sharaf-Rashidov district Number of schools in total	60	60	61
Number of pupils, people	39413	40465	41810

https://stat.uz/ruSource: https://stat.uz/ru

There are 7 vocational colleges in the Jizzakh region, and there are no colleges in the Sharaf-Rashidov district. Since 2019, the total number of colleges in the region has decreased from 76 to 7 due to the education reform related to the introduction of 11 years of secondary education.

3 http://who-fic.ru/icd/

7.6 Labor force and employment

The working-age population of Uzbekistan is almost 56% (as of the end of 2023). About 66% of this number is actually employed in the country's economy. 602 700 people of working age live in Jizzakh region, 89% of whom are currently employed.

The official unemployment rate in Uzbekistan is 10.5% (at the beginning of 2022), which is almost twice as high as in 2016. Similar figures are given in the reports of the Khokimiyat of the Jizzakh region: 9.3% of the inhabitants of the region, in Jizzakh city - 8.7% (7,400 people) have the status of unemployed in 2023.

It should be noted that the actual unemployment rate, especially in rural areas, may differ from official statistics, since not all local residents are registered with employment agencies. Thus, the real unemployment rate is likely to be higher. There are also cases of underemployment, when citizens work part-time, but would prefer full-time employment and are able to work full-time.

Before the pandemic (in March 2020), the average nominal salary in the Jizzakh region was 2 865 1 thousand UZS.

For the period January-December 2023, the nominal average monthly salary in Sharaf-Rashidov district amounted to 2 743,0 thousand UZS and, in relation to the indicators of the average monthly salary of the region, amounted to 79.0%.

According to statistical data of Sharaf-Rashidov district, the economically active population is 61.7 thousand people, of which the employed population is 55.1 thousand people, the number of unemployed is 6.6 thousand people (Table 16).

Table16 The number of economically active population, employed and unemployed by regions of the Jizzakh region

Name	The total number of economically active population, thousand people.	of these:		Unemployment rate as a percentage
		employed population	unemployed	
2022				
Jizzakh region	**602,7**	**546,4**	**56.3**	**9.3**
Jizzakh city	85,3	78,0	7,4	8,7
Sharaf Rashidov district	92,7	84,2	8.5	9,2

Based on statistical data, the unemployment rate considered for 2020-2022 decreased from 11% to 9.2%. Representatives of local communities claim that the number of unemployed is growing every year, the unemployed are not registered at the labor exchange, as the offered vacancies are low-paid and the unemployed prefer "gray" work in the markets or leave to work in other regions.

The distribution of the employed population by type of economic activity has not changed significantly over the period from 2020 to 2022. Activities such as industry, education, health care and social services gradually increased the employment of workers throughout the period and were the most in demand in the district and the region

The estimated number of migrant workers increased by 13% over the period, including female migrant workers. The smallest number of the population is engaged in agriculture, although the increase over the period amounted to 30%, residents of makhallas began to rent fields and engage in seasonal agricultural work.

During the consultations, representatives of the makhallas reported on the high

unemployment rate of the local population, especially among women and youth. Young people, despite having specialized education, have little chance of earning an independent income or getting a qualified job.

The main source of income for local residents of the surveyed communities is work at enterprises in Jizzakh city, trade in local markets, as well as work in municipal services of the city.

Women work in sewing workshops, in medical institutions, preschool institutions or trade in bazaars. Men also work in construction.

According to official data, labor migration rates in the surveyed makhallas are quite high and, as interviews with local residents have shown, as a rule, one person from each family, mostly young men, go abroad to work.

Directions of labor migration – Tashkent, Russian Federation, Kazakhstan. Since men currently make up the majority of migrant workers, women are forced to cope with the responsibilities of the head of the family.

Taking into account all sources of income, the monthly household income averages 2.5-5 million UZS per month. Families with incomes over 5 000 000 UZS are considered well-off. The minimum income is considered to be 1 500 000 UZS.

Among the main sources of income for residents of settlements are the income, as a rule, of one or two family members from work in production, in government organizations, in the form of wages (kindergartens, schools, paramedic and obstetric centers, etc.).

Remittances from migrant workers are an important source of income for many families. Regarding household expenditure patterns, interviews with residents suggest that the main expenditures are on food, utilities, education and ritual expenses (weddings, funerals, etc.).

7.7 Status and land use

The project for the construction of combined-cycle gas power plant is being implemented on the territory of a 9.42 ha land plot allocated for construction by the Khokimiyat of Sharaf-Rashidov district on the basis of the decision of the Khokim of the district No. 01-51 dated 30/01/2024.

In fact, according to the document, 9.43 hectares of land belonging to the farm were transferred to the state on a permanent basis, and 2 hectares of land were taken for temporary use and returned to the farm after the completion of the construction of the facility.

Prior to the start of the project, this site with buildings for livestock belonged to the “Donabek Sano” Farm Enterprise on the basis of cadastral documentation No. 4429 dated 31/10/2018.

Before part of the farm’s land was acquired for the power plant construction project, the total area of the farm was 46 hectares. Of these, 4 hectares are irrigated lands, the rest are rain–fed.

Prior to the start of the project, the Khokimiyat of the district held consultations with the farmer, measurements of the land plot and an assessment of the farm’s property.

Based on the assessment report, the amount of compensation amounted to 507 100 000 UZS, the report was agreed upon with the head of the farm and, on the basis of an agreement concluded between the farmer and the Khokimiyat, the amount was paid to the farmer in two stages:

1. Amount of 400 000 000 UZS - 11/03/2024
2. Balance in the amount of 107 100 000 UZS - 12/06/2024

Project-related facilities: new access road to the power plant, length of about 90 meters, power lines with a length of approximately 8 and 10 km from the project area to the existing 220 kV overhead lines L-20-D and L-Z-S, gas pipeline line, water supply route, preliminary starting from the surface water intake, drainage canal of the Jizzakh reservoir is currently at the design and approval stage.

In accordance with the Project Agreement, all connection points and the construction of linear facilities must be provided by local government agencies, gas and water supply organizations, and National electric networks.

It is likely that the construction of infrastructure (associated facilities) will lead to the economic displacement of land users, temporary and permanent alienation of land plots.

But since the routes of linear objects are not currently defined, it is not possible to determine the impact at this stage of the assessment.

For more information, see 128-0948-ESIA-PE-3 in Section 10.

7.8 Access to public and social services

According to national statistics for 2023, 92.8% of households in rural areas of Uzbekistan have access to drinking water supply services at a basic level. The vast majority of rural settlements (90%) do not have sewage systems (Table 17).

Table 17 Proportion of the population of Uzbekistan with access to safe drinking water

Category	2019 y.	2020 y.	2021	2022	2023 y.
Households receiving basic drinking water services, urban areas	93,9	94,1	91,1	91,4	92,8
Households receiving basic drinking water services, rural areas	83,2	80,4	81,2	81,2	81,9
Households receiving basic drinking water services	88,8	87,6	86,4	86,6	87,6
Households with access to safe drinking water, urban settlements (% of urban households)	99.8	99,1	98,8	99,1	98,8
Households with access to safe drinking water, rural settlements (% of households in rural settlements)	96,1	97,2	96,7	98.0	98,7
Households with access to safe drinking water (% of households)	98.0	98,2	97,8	98,6	98,7

Source: https://stat.uz/

In the Jizzakh region, more than 74% of households in rural settlements have access to drinking water supply services. All settlements of the region are connected to the power supply network.

During the period January-December 2023, in the Sh.Rashidov district, a total area of 62.6 thousand square meters of residential buildings and buildings was put into operation, which is 110.0% compared to the same period in 2022. In the field of municipal construction, 188.0 km of water supply networks and 2.5 km of gas supply networks were put into operation.

Households in the Sharaf-Rashidov district in the project impact zone are provided with centralized public services to varying degrees.

According to information received during consultations with representatives of the

makhallas, the settlements are fully gasified and connected to the electricity network, but local residents complain of power outages and do not have centralized sewerage.

The social objects of the project's territory of influence are presented in the table below. Olmachi makhalla is the most developed in the social sphere; on its territory, in addition to a market, kindergartens and a school, there is also 1 clinic. There are also 2 pharmacies and 25 shops in the Olmachi makhalla, while pharmacies are absent in the other 2 makhallas of the project area, and the number of shops varies from 9 to 12 (Table 18).

Table 18 Social objects of the territory of the planned activity[4]

Name	Gozgontepa	Khalkobad	Pastki Sukokli	Olmachi	Total
Kindergartens	2	5	8	6	21
College	0	0	0	0	0
School	1	1	1	1	4
higher education institution	0	0	0	0	0
Clinics	1	1	0	1	3
Pharmacies	0	1	0	2	3
Shops	12	12	9	25	58
Restaurants	0	1	0	0	1
Catering	2	4	1	8	15
Market	0	3	0	1	4
children's/ sports playgroun d	2	2	0	4	8
Beauty salons	0	0	0	0	0
Training center	0	0	0	0	0
Mosque	1	1	0	1	3
Recreation center	0	0	0	3	3
Industrial enterprises	0	0	0	0	0
Cemeteries	2	1	0	1	4

7.9 Transport infrastructure

Transport corridors between Asian and European countries pass through the Jizzakh region. It borders two countries at once - Tajikistan and Kazakhstan. In addition, Jizzakh lies on the way from the capital to Samarkand, Bukhara and the Ferghana Valley. Geographical location is one of the most important factors in the development of the region's economy and the road infrastructure of the whole country.

In the field of infrastructure development in the Jizzakh region, 38 km of highways were laid in 2016-2020, the total length of railways is 217.8 km.

The main highway from Tashkent to Jizzakh city is route M–39, 202 km long.

In 2023, 8523.3 thousand tons and 5203.6 thousand tons, respectively, were transported by all types of road transport in the Jizzakh region and Sharaf-Rashidov district, the volume of traffic in the district is 61% of the total volume of the region.

In 2023, 21,698.7 thousand passengers and 2,621.2, respectively, were transported by all motor vehicles in the Jizzakh region and Sharaf-Rashidov district.

[4] According to the makhalla passports.

The flow of vehicles on the M-39 highway, the section before entering the project area, next to the turn is quite intense and almost continuous, 6-15 vehicles per minute on a weekday (based on 30 minute observations in the morning, afternoon and evening on weekdays and weekends). Traffic intensity data is presented in the table below (Table 19).

Table 19 Traffic intensity on the M-39 highway

Name	Weekday			Weekend		
	9-00 up to 9-30	16-45 up to 17-15	from 20-00 up to 20-30	9-00 up to 9-30	16-45 up to 17-15	from 20-00 up to 20-30
Passenger cars	455	429	315	308	214	110
Trucks	26	34	10	5	4	3
Total	481	463	325	313	218	113

Passenger high-speed railway with a length of 741 km passes through Jizzakh city and the Sharaf-Rashidov district, connecting the largest cities of Uzbekistan - Tashkent, Samarkand, Bukhara, Karshi, Navoi.

7.10 Gender Aspects

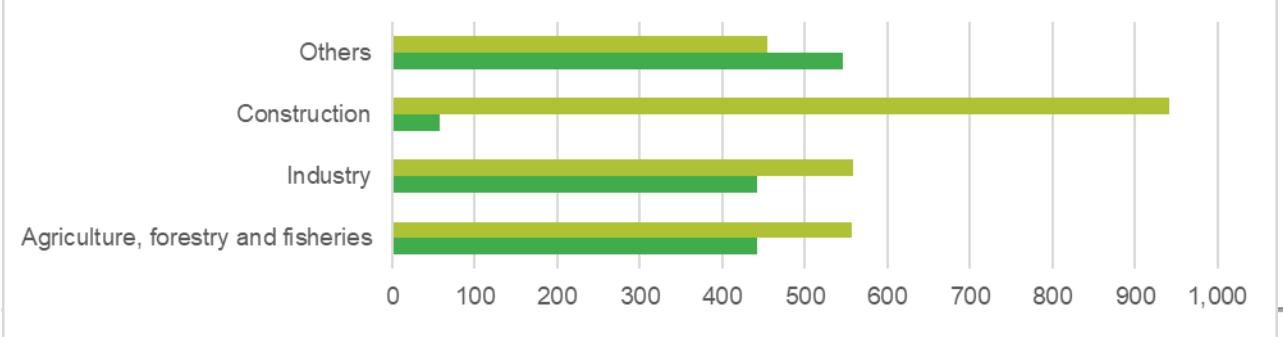
There is no legislation on gender equality in Uzbekistan, although recent national reforms have improved women's economic opportunities.

In February 2019, the President of Uzbekistan signed a decree aimed at "dramatically improving support for women and strengthening the institution of the family." The law criticizes the current situation with women's rights and their participation in the country's affairs. Also, in recent years in the country, issues of gender equality have been raised to the level of state policy, 25 legislative acts have been adopted, the share of women in political parties has reached 44%, in higher education - 40%, in entrepreneurship - 35%, women are widely involved in information and communication, innovation, energy, and engineering fields.

The Committee for Women's Affairs of Uzbekistan, created in 1991, cooperates with political parties representing the interests of women, provides support and assistance to women in various social spheres, such as healthcare, education, culture, sports, etc. He also opens adaptation centers, conducts seminars, workshops and trainings for women who want to start their own business, offers them consulting services, organizes exhibitions and fairs. The Women's Affairs Committee is also engaged in legislative activities, developing gender-specific laws aimed at improving the status of women in society.

In 2013, the website of the State Statistics Committee was developed jointly with the Committee on Women's Affairs of Uzbekistan (www.gender.stat.uz). The site contains information in three languages: Uzbek, Russian and English to provide users with gender-sensitive information in areas such as population, health, labor, social security, etc. However, a mechanism for the regular collection of gender statistics has not yet been established.

Employment statistics for the country show *(*Figure 13*)* that women employed in industry and agriculture in Uzbekistan account for approximately 44% of the total number of



employed and only 6% of the total number of employed in the construction sector. The same ratio remains in the area of the planned activity.

Figure 11 Employment, divided by sector and gender, 2022

Source: https://gender.stat.uz/en/

According to the results of focus group studies, out of the total number of respondents, 41 people, 4 makhallas of the social impact zone, a focus group of women from the project area (13 women) was formed.

Almost 90% of the women surveyed do not work because there are no job opportunities, most of them trade on the market or do homework. At the same time, many have degrees from colleges and even institutes.

When asked what jobs are available for women in the region, 21 respondents answered that there are no places for employment at all, 5 answered that it is possible to get a job as a teacher in preschool institutions, if you have the appropriate education, and 10 people answered that you can get a job in a sewing workshop, but securing work is related to orders, which is not always stable.

7.11 Vulnerable groups of the population

Vulnerable groups of the population include families without breadwinners, women, heads of households and those affected by gender imbalance, lonely elderly people (pensioners and war veterans), the disabled, the unemployed, including unemployed young people and women, poor and disadvantaged families.

Vulnerable groups living in the nearest makhallas are likely to be highly dependent on the Project, as they are more likely to suffer from the impact of the Project and/or will be more limited than others in their ability to take advantage of the benefits and benefits of the Project due to their social status.

Table 20 Vulnerable groups of the makhalla population of the project area[5].

Name	Gozgontepa	Khalkobad	Pastki Sukokli	Olmachi	Total	% of the total number of families/ residents of makhallas[6]
Number of families without breadwinners, units.	14	22	-	41	77	0,016%
Number of single mothers/fathers, people.	-	2	-	1	3	0,0006%
Lonely elderly people, persons.	-	4	-	2	6	0,00023%
Number of large families, units.	20	10	-	49	79	0,016%
Number of poor families, units	10	55	27	45	121	0,02%
Number of financial assistance recipients, people.	8	28	11	98	145	0,03%
Number of recipients of disability benefits, people.	18	34	22	40	114	0,0044%

According to social research estimates, the female population is about 12,084, including 5,464 women of working age.

In total, there are 4,827 families in 4 makhallas (Table 20). Living conditions in the makhallas are assessed at a fairly high level, given that almost all households have access to water, electricity and gas supply.

Families who have lost a breadwinner are considered disadvantaged households that have difficulty maintaining their income due to the loss of household members involved in economic activities.

The available data indicate a small number of such families, only 77 families, which is only 0.016% of the families of all makhallas. There are also 79 large families registered in makhallas, 121 families have the status of poor and receive appropriate benefits.

7.12 Cultural heritage

It should be noted that in total in Jizzakh region 427 cultural heritage sites have been taken under state protection, including 100 shrines of historical areas, 268 archaeological sites, 59 monumental monuments.

The main areas rich in monuments of cultural and archaeological heritage are Firish and Bakhmali.

[5] According to the makhalla passports.

[6] The total number of families is 4827, the total number of inhabitants is 25,873 people (4 makhallas).

In total, 44 heritage monuments are registered on the territory of Sharaf-Rashidov district, according to the state register of cultural and architectural heritage sites. The nearest archaeological site is located at a distance of more than 5.5 km from the project area.

The three monuments closest to the project area are located on the territory of the Pastli-Sulokli makhalla.

Table 21 List of objects of cultural and architectural heritage of Sharaf-Rashidov district closest to the project area

№.	**Name of the object**	**Project construction period**	**Address of the object**
1	Safarboytepa	7th-8th century	Pastli-Sulokli Makhalla, Mustakillik Street
2	Nomsiztepa -1	5th-8th century	Pastli-Sulokli Makhalla, Toshkentlik Street
3	Nomsiztepa -1	5th-8th century	Pastli-Sulokli Makhalla, Toshkentlik Street

Request was sent to the Agency for Cultural Heritage of the Jizzakh Region to obtain data on significant cultural and archaeological heritage sites located next to the facility under construction.

Information was received from the Agency about three monuments presented in the table above. The distance to the objects exceeds 5 kilometers.

As a result of the joint departure of UMK specialists and the Cultural Agency

Based on the above, it is advisable to include a Procedure for detecting accidental finds in the Environmental and Social Management Plan.

“CENGIZ ENERJI SAN. VE TIC A.Ş.”

Construction of combined-cycle power plant with a capacity of 550 MW

Environmental and social impact assessment

Preliminary report

Book 3

125-1105-ESIA

REGISTRY OF DOCUMENT VERSIONS

Item	Version	Date	Status
1.	125-1105-ESIA Version_P0 Book 2	26-07-2024	Preliminary Version of the Report sent by “CENERGO” LLC

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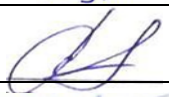
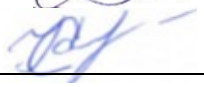
Chief sociologist	B. Mavlyanov	
Acoustician	S. Kasimkhodjaeva	
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8 ZONE OF INFLUENCE OF THE PROPOSED ACTIVITY

According to the IFC PS-1 definition, area of influence – an area (territory) that can be affected by:

- the project, activities and facilities of the Customer directly operated or managed by him (including his contractors) and included in the project;
- impacts of unplanned but foreseeable circumstances caused by the project that may occur at a later time or in a different location; or
- indirect impacts of the project on biodiversity or ecosystem services that are a means of livelihood for the affected communities.

The zones of influence of the combined cycle gas turbine power plant project include territories that will be directly and indirectly affected by the main objects of the project and its infrastructure.

The project area of influence on the environment includes:

- a plot of land directly intended for the construction of Project facilities;
- the site of the discharge of treated wastewater from a combined-cycle power plant into an irrigation canal;
- zone of permissible impact of the project on atmospheric air;
- municipal territories adjacent to the construction site (makhallas), including municipal territories within the boundaries of the SPZ of the power plant;
- zone of acoustic discomfort, including the zone of acoustic impact of the railway;
- territories where the risk to public health associated with chemical pollution of the atmosphere takes on minimal values (individual carcinogenic risk does not exceed 1.0E-06, hazard coefficients (HC) of substances do not exceed 0.1, hazard indices (HI) of effects on organs/systems are less than 1.0);
- the right-of-way lanes of associated facilities (highway, power lines, gas pipeline and water supply) and associated zones of chemical and acoustic pollution of atmospheric air.

The zone of influence of the project on atmospheric air, this is an area within the conditional boundaries of the total isoline of concentrations equivalent to 0.05 MPC of all pollutants (taking into account measures to reduce emissions), defines the territory beyond which the impact of the projected object becomes absolutely insignificant.

The social impact zone of the project includes territories associated with directly and/or indirectly affected communities, which can be influenced by the project facilities, its infrastructure facilities, which are used in the implementation of the planned activities.

The project area of influence on the social environment includes:

- land plots intended for the construction of power plant facilities
- municipal territories – makhallas adjacent to the power plant, within the boundaries of the SPZ;
- zone of indirect influence of the project (includes Jizzakh city as a whole, Sharaf-Rashidov district of Jizzakh region).
- the right-of-way lanes of associated facilities (highway, power lines, gas pipeline and water supply) and associated farm lands;

The main recipients include components of the social environment: personnel,

population, infrastructure, as well as socio-economic factors (living conditions of the population, including employment, demographic shifts, social infrastructure, ethnic characteristics, etc.).

9 ENVIRONMENTAL IMPACT ASSESSMENT

9.1 IMPACT ON ATMOSPHERIC AIR QUALITY

The forecast of the planned activity impact on the quality of atmospheric air was calculated using software implementing the methodology adopted in the Republic of Uzbekistan (the Ecologist model).

The use of computational methods for predicting chemical pollution of atmospheric air seems to be a reasonable and only possible solution due to the fact that the use of direct measurements of the current level of atmospheric air pollution depends on many factors, the main of which is the operating mode of enterprises, and the forecast of chemical pollution of atmospheric air in relation to the planned activities has no reasonable alternatives to modeling.[1]

Computational methods are also preferable due to the fact that they implement a conservative approach to forecasting air quality, that is, they take into account the simultaneous functioning of sources of atmospheric air pollution and potentially the worst combinations of meteorological factors.

9.1.1 Assessment methodology

To assess the level of chemical pollution of atmospheric air, quality standards established by hygienic standards of the SanR&N of the Republic of Uzbekistan No. 0293-11 were used [2].

The requirements of IFC industry practices were used in the development of measures necessary to prevent, mitigate and/or compensate for negative effects on atmospheric air. The production facilities of the projected facility are subject to the requirements of the general EHS Guidelines [4], as well as the Guidelines on Environmental, health and labor protection for thermal power plants. [5].

The EHS Guidelines provide such levels and performance parameters that are generally considered achievable at newly commissioned facilities at a modern level of technology and reasonable costs.

The emission levels given in the EHS Guidelines correspond to international best practices and must be observed without dilution for at least 95% of the operating time of the installation or enterprise, calculated as a proportion of working hours per year. These standards are feasible under normal operating conditions of properly designed and operated enterprises through the use of pollution prevention and reduction methods.

[1] The results of monitoring the existing level of chemical pollution of atmospheric air in the area of planned activities are fully presented in Report 125-1105-BIO-Air, see also Section 6.10.1 of Report 125-1105-ESIA-PE-0, Book 2.

The emission levels (concentrations of pollutants at the mouth of the sources) of the projected facility comply with the requirements of the IFC.

Modeling of dispersion of pollutants was carried out using the “Ecolog”, Unified Program of air pollution estimation (UPAPE), version 4.60 (“Integral” Firm", LLC, Russian Federation).

The program allows you to calculate the fields of maximum single concentrations of pollutants corresponding to a combination of unfavorable meteorological conditions and average concentrations of pollutants in the atmospheric air, corresponding to a long averaging time, in particular, annual average concentrations.

Also, when assessing the level of atmospheric pollution, quotas for the permissible content of pollutants in the surface layer of the atmosphere, determined for the project area in accordance with the requirements, were taken into account [3].

9.1.2 Construction stage

The sources of pollutant emissions at the construction stage of the power plant will be construction machinery and vehicles:

- welding and painting works;
- concrete and mortar assembly;
- earth-moving equipment (bulldozers, excavators);
- assembly equipment (truck cranes, caterpillar cranes);
- construction machines and vehicles, forklifts.

Sources related to construction emit 15.435 tons of pollutants of 17 types into the atmosphere per year. The ejection power will be 5,584 g/s.

The calculations were performed on a site of 4200 x 7000 m, covering the territory of the sanitary protection zone of the enterprise and the nearest residential development of Sharaf Rashidov district. The step of the calculated grid on the site is assumed to be equal to 100 meters. Additionally, 19 calculation points were selected in the residential areas of Sharaf Rashidov district, the height of which corresponds to the level of respiration – 2 m.

The calculation results are presented in the table (Table 9.1.1).

The assessment of atmospheric pollution at the construction stage showed that there were no exceedances of the maximum permissible concentrations established in the Republic of Uzbekistan [2] in residential areas of Sharaf-Rashidov district.

Table 9.1.1. Levels of air pollution at the construction stage

	Pollutant	MPC type	Values of MPC and SRLI mg/m3	Hazard class	Maximum concentration on housing, MPC shares
1	Iron oxide	MPC max/one-time	0,200	3	0.03
		MPC av. daily	0.120		
		MPC av. annual	0,040		
2	Manganese and its compounds (calculated on manganese (IV) oxide)	MPC max/one-time	0.005	2	0.14
		MPC av. daily	0,003		
		MPC av. annual	0.001		
3	Nitrogen dioxide (Nitrogen dioxide; nitrogen peroxide)	MPC max/one-time	0.085	2	0.15
		MPC av. daily	0,060		
		MPC av. annual	0,040		
4	Nitrogen (II) oxide (Nitrogen monoxide)	MPC max/one-time	0.600	3	0.10
		MPC av. daily	0.250		
		MPC av. annual	0,060		
5	Hydrocarbons	MPC max/one-time	1.000	4	0.07
		MPC av. daily	-		
		MPC av. annual	-		
6	Sulfur dioxide	MPC max/one-time	0.500	3	0.05
		MPC av. daily	0,200		
		MPC av. annual	0.050		
7	Oxocarbon (oxide of carbon; carbon monoxide; carbonic oxide gas)	MPC max/one-time	5.000	4	0.05
		MPC av. daily	4.000		
		MPC av. annual	3.000		
8	Soot	MPC max/one-time	0.150	3	0.10
		MPC av. daily	--		
		MPC av. annual	--		
9	Benz/a/pyrene	MPC max/one-time	1,00e-06	1	0.03
		MPC av. daily	1,00e-06		

		MPC av. annual	1,00e-06		
10	Formaldehyde (Methyl aldehyde, oxomethane, methylene oxide)	MPC max/one-time	0.035	2	0.07
		MPC av. daily	0.012		
		MPC av. annual	0,003		
11	Silicon oxide	MPC max/one-time	0.150	4	0.06
		MPC av. daily	-		
		MPC av. annual	-		
12	Fluorides are poorly soluble	SRLI	0,200	2	0.04
13	White Spirit	SRLI	1.000	4	0.08
14	Hydrogen fluoride	MPC max/one-time	0.01	2	0.04
		MPC av. daily	--		
		MPC av. annual	--		
15	Xylene	MPC max/one-time	0.500	3	0.15
		MPC av. daily	0.350		
		MPC av. annual	0.150		
16	Dust inorganic >70% SiO2	MPC max/one-time	0.150	3	0,28
		MPC av. daily	0.100		
		MPC av. annual	0.050		

Pollutant		MPC type	Values of MPC and SRLI mg/m3	Hazard Class	Maximum concentration on housing, MPC shares
17	Cement dust	MPC max/one-time	0.500	2	0.14
		MPC av. daily	0,200		
		MPC av. annual	0.100		

The impact on atmospheric air during the construction period is characterized by a short duration, while the zone of excess pollution is localized outside residential buildings. Thus, exposure to atmospheric air during the construction period is acceptable.

9.1.3 Operational stage

It is planned to install a Siemens SGT5-4000F V10 gas turbine unit (GTU) with a capacity of 365.3 MW (50 Hz), manufactured in Germany (1 unit) on the territory of the combined-cycle power plant. Also, at the planned power plant, electric energy will be generated using a steam turbine (ST) “Siemens SST-700/900”, with a capacity of 185.3 MW, "manufactured in Germany.

In addition to the main equipment, the following equipment, installations and equipment will be used, as a result of which pollutants will also be released into the atmospheric air:

- diesel generator;
- hot water boiler;
- gas welding machines;
- electric welding machines;
- operation of metalworking machines;
- oil storage tanks;
- storage tanks for motor fuel;
- express laboratory;
- battery charging stations.

The main source of emissions of pollutants is the Siemens SGT5-4000F series gas turbine unit, which uses a new generation of technology, providing higher efficiency due to better aerodynamics of the compressor and turbine.

According to the Environmental Impact Statement (EIS project), taking into account the requirements for design solutions of a combined-cycle power plant, 20 pollutants are projected to be released into the atmosphere from the sources of emissions of the projected enterprise. The total emission of pollutants will be:

- the maximum one-time emission is 92.3693 g/s;
- the gross emission is 3046.52 tons/year.

Calculations of atmospheric pollution were carried out on a site of 4200 x 7000 m, covering the territory of the sanitary protection zone of the enterprise and the nearest residential development of the Sharaf Rashidov district. The step of the calculated grid on the site is assumed to be equal to 100 meters. Additionally, 32 design points were selected along the perimeter of the SPZ, the height of which corresponds to the breathing layer – 2 m.

To account for the contribution of the projected enterprise to atmospheric pollution,

calculations were performed for the future, taking into account the commissioning of the enterprise's facilities (maximum one-time concentrations, average annual concentrations, average daily concentrations). The calculation results are presented in the table (Table 9.1.2).

The maximum concentrations of pollutants at the border of the SPZ and residential areas will not exceed the established [2] standards for atmospheric air quality, taking into account the requirements [3] for the permissible content of pollutants in the surface layer of the atmosphere.

As calculations have shown, the commissioning of the projected enterprise will not lead to a significant (more than 0.1 MPC) increase in atmospheric pollution in the territories adjacent to the combined-cycle power plant.

Table 9.1.2. Atmospheric pollution levels at the operational stage

Name of the pollutant		MPC or SRLI mg/m3		Hazard class	The established quota (in shares of MPC)	Maximum concentration in fractions of MPC	Compliance with the established quota (+/-)
1	Hydrogen fluoride	MPC av. daily	0.01	2	0,25	0.066	+
		MPC av. annual	0.005			<0,01	+
2	Iron oxide	MPC max/one-time	0,2	3	0,33	0,0031	+
		MPC av. daily	0,12			<0,01	+
		MPC av. annual	0.04			<0,01	+
3	Silicon oxide	SRLI	0.15	3	0,33	0,0031	+
4	Manganese and its compounds (in terms of manganese (IV) oxide)	MPC max/one-time	0.005	2	0,25	0.0035	+
		MPC av. daily	0,003			<0,01	+
		MPC av. annual	0.001			<0,01	+
5	Nitrogen dioxide (Nitrogen dioxide; nitrogen peroxide)	MPC max/one-time	0.085	2	0,25	0.206	+
		MPC av. daily	0.06			0.01	+
		MPC av. annual	0.04			0.01	+
6	Nitric acid (according to the molecule HNO3)	MPC max/one-time	0.4	3	0,33	<0,01	+
		MPC av. daily	0.3			<0,01	+
		MPC av. annual	0.15			<0,01	+
7	Nitrogen (II) oxide (Nitrogen monoxide)	MPC max/one-time	0.6	3	0,33	0,006	+
		MPC av.	0,25			<0,01	+

		daily					
		MPC av. annual	0.06			<0,01	+
8	Sodium hydroxide	MPC max/one-time	0.1	3	0,33	<0,01	+
9	Hydrochloric acid	MPC max/one-time	0.02	2	0,25	0.0002	+
		MPC av. daily	0.01			<0,01	+
		MPC av. annual	0.005			<0,01	+
10	Sulfuric acid (according to the molecule H2SO4)	MPC max/one-time	0.3	3	0,33	0,0001	+
		MPC av. daily	0.2			0.01	+
		MPC av. annual	0.1			<0,01	+
11	Hydrocarbons	MPC max/one-time	1	4	0.5	<0,01	+
		MPC av. daily	0.5			<0,01	+
		MPC av. annual	0.025			<0,01	+
12	Sulfur dioxide	MPC max/one-time	0.5	3	0,33	0.001	+
		MPC av. daily	0.2			<0,01	+
		MPC av. annual	0.05			<0,01	+
13	Carbon monoxide (Carbon oxide; carbon monoxide; carbon monoxide)	MPC max/one-time	5	4	0.5	0.018	+
		MPC av. daily	4			<0,01	+
		MPC av. annual	3			<0,01	+

Name of the pollutant		MPC or SRLI mg/m3		Hazard class	The established quota (in shares of MPC)	Maximum concentration in fractions of MPC	Compliance with the established quota (+/-)
14	Fluorides are poorly soluble	MPC max/one-time	0,2	2	0,25	0.0044	+
		MPC av. daily	0.1			<0,01	+
		MPC av. annual	0.05			<0,01	+
15	Ammonia	MPC max/one-time	0,2	4	0.5	0,0001	+
16	Ethanol (Ethyl alcohol; methylcarbinol)	MPC max/one-time	5	4	0.5	<0,01	+
17	Acetic acid	MPC max/one-time	0,2	3	0,33	0,0003	+
		MPC av. daily	0.012			<0,01	+
		MPC av. annual	0.06			<0,01	+
18	Aerosol emulsifier	MPC max/one-time	0.1	3	0,33	<0,01	+
19	Abrasive dust	SRLI	0,040	3	0,33	0.022	+
20	Metal dust	MPC max/one-time	0,2	3	0,33	0.027	+
		MPC av. daily	0,12			<0,01	+
		MPC av. annual	0.04			<0,01	+

Thus, the risk assessments showed:

- the maximum level of the total individual carcinogenic risk of SPZ throughout life at the border and outside the boundaries of the design SPZ of the enterprise does not exceed the value of 1.0 E-04, which corresponds to a low/acceptable risk level.
- The values of non-carcinogenic risk at the border of the SPZ of the enterprise and in the residential area are characterized by a low level. The coefficients (HQ) and indices (HI) of the danger of acute and chronic exposure do not exceed the permissible values (1.0 and 3.0, respectively).
- It has been established that at the border and outside the limits of the design SPZ of the enterprise, in the residential development zone, there are no exceedances of the reference (RfC) concentrations of acute and chronic exposure to all priority pollutants. Thus, atmospheric air pollution outside the boundaries of the SPZ of a combined-cycle power plant does not exceed acceptable levels for any risk indicator, and exposure is permissible based on the risk to public health created.

9.1.4 Recommendations

9.1.4.1 Measures to prevent and mitigate impacts

Construction stage

To prevent chemical pollution of the atmosphere at the construction stage, planning solutions are used: the construction site is as far away from residential areas as possible.

The following organizational and technical measures are recommended to mitigate the effects of pollutants on the atmospheric air:

- organization of construction in strict accordance with the planning, technological and technical solutions of the project;
- carrying out work in accordance with good practice, compliance with the rules of work, the involvement of personnel with the necessary qualifications for the production of work;
- monitoring of the technical condition of engines and exhaust systems of vehicles, machinery (bulldozers, excavators, cranes) to exclude the operation of machinery with increased emissions of pollutants;
- exclusion of the operation of car engines and construction equipment at a time when work is not being carried out.

Operational stage

To prevent chemical pollution of the atmosphere at the operational stage, the designed facility uses:

- Organization of the production process using a combined cycle gas plant. The connection of gas turbine units and steam turbines into a single unit allows to reduce the loss of heat from the exhaust gases of gas turbine units, it is useful to use gases in a recovery boiler, get additional power and increase efficiency compared with steam turbine and gas turbine power plants, reduce emissions of pollutants, in particular nitrogen oxides into the atmosphere.

- organization of a sanitary protection zone, planting of trees.

9.1.4.2 Monitoring and reporting

To control chemical pollution of atmospheric air, it is proposed to measure the level of pollution at points that simultaneously meet the following conditions:

- maximum proximity to the SPZ of the enterprise;
- minimum distance to territories (sites, facilities) with normalized habitat quality;
- the closest approximation to the zones of maximum levels of chemical pollution and maximum values of the risk criteria for public health associated with the enterprise.

The following points of instrumental control of atmospheric air quality (PCA) correspond to the specified criteria:

Table 9.1.7. List and description of points of sanitary and hygienic control of atmospheric air quality

Point No	**Address / spatial reference**	**Geographical coordinates of the point**	
PCA-1	Residential development near the construction site	40° 5’25.18"N	67°56’45.57"W
PCA-2	Gas distribution station near the construction site	40° 5’25.99"N	67°56’25.02"W
PCA-3	Cemetery behind the railway line	40° 5’38.85"N	67°56’27.38"W
PCA-4	Garbage dump outside the project area	40° 5’47.22"N	67°57’19.47"W

The research (measurement) program includes harmful (polluting) substances for which, according to the results of dispersion calculations at the border of the sanitary protection zone and at the border of the nearest residential development and (or) other territories with normalized indicators of habitat quality:

- specific substances characteristic of industrial emissions of the enterprise;
- substances that form the main risk to public health at the border of the sanitary protection zone and residential development in the area of influence of the enterprise of more than 1.0 HQ (hazard coefficient) and/or individual carcinogenic risk of more than $1 * 10^{-4}$ (control is carried out by average daily surface concentrations).

Based on the criteria of risk to public health, in order to control the average daily concentrations, the following substances should be included in the research (measurement) program:

- nitrogen dioxide;
- sulfur dioxide;
- nitrogen oxide;
- carbon monoxide;
- dust (suspended substances).

Chemical sampling is carried out for at least 10 days for each substance at each point, once every 6 months.

The result of measurements of atmospheric pollution levels are protocols.

According to the monitoring results, corrective actions are taken when determining the

excess impact of sources of pollutants of the enterprise on residential areas:

- identification of sources that make the greatest contribution to air pollution;
- development and implementation of additional air protection measures.

Proposals for monitoring and reporting are presented in Table 9.1.8.

9.1.5 Assessment results

The matrix of atmospheric air assessment results is shown in Table 9.1.9.

It is established that the significance of the impact of the planned activity on the state of the atmosphere is estimated as negligible at the construction stage and low at the operation stage, taking into account the proposed measures to minimize it.

Table 9.1.8. Measures to prevent and mitigate exposure to atmospheric air

Item	Activity/ process	Task	Measures	Applicable requirements	Monitoring	Implementation method/ reporting
I.	**Construction stage**					
1.	• Construction works (excavation, general construction, welding, painting) • Transport and logistics (delivery of raw materials, fuels and lubricants, other transportation)	• Prevention of excess atmospheric pollution • Mitigation of the impact of pollutants on atmospheric air • Compensation of excess atmospheric pollution	• Planning solutions (removal of the construction site from residential areas) • organization of construction in strict accordance with the planning, technological and technical solutions of the project • carrying out work in accordance with good practice, compliance with the rules of work, the involvement of personnel with the necessary qualifications for the production of work • monitoring of the technical condition of engines and exhaust gases of cars, bulldozers, excavators, and other equipment to exclude the operation of equipment with increased emissions of pollutants • exclusion of the operation of car engines and construction equipment at a time when work is not being done	• SanR&N RUz N 0293-11 • IFC General EHS Guidelines sections 1.1 and 4.1. • The interstate standard GOST 31967-2012. • GD 52.04.186-89 "Atmospheric Pollution Control Guidelines"	• Measurement of atmospheric pollution levels in adjacent residential areas in accordance with the proposed schedule • inspections at the construction site	• Implementation of environmental management measures in accordance with the project documentation and the construction organization project • compliance with the requirements of national legislation in the field of environmental protection • training of construction contractor's personnel and maintaining their awareness • reporting on the results of measuring atmospheric pollution levels • reporting on inspection results
II.	**Operational stage**					
2.	• The main production process • Provision of basic production activities • Transport and logistics (delivery of raw materials, fuels and lubricants, other transportation)	• Prevention of excess atmospheric pollution • Mitigation of the impact of pollutants on atmospheric air • Compensation of excess atmospheric pollution	• organization of a sanitary protection zone, planting of trees. • organization of the production process using the latest combined cycle gas plant.	• SanR&N RUz N 0293-11 • IFC General EHS Guidelines, section 1.1 • IFC Guidelines on EHS for Metallurgical Plants, sections 1.1 and 2.1 • IFC Guidelines on EHS for cement and lime production, sections 1.1 and 2.1 • IFC Guidelines on EHS for Thermal Power Plants, sections 1.1 and 2.1 • GD 52.04.186-89 "Guidelines on atmospheric pollution control"	• Measurement of atmospheric pollution levels in adjacent residential areas in accordance with the proposed schedule • control of pollutant emissions at sources in accordance with the schedule developed in the draft environmental regulations	• Implementation of environmental management measures in accordance with the project documentation of the enterprise and the List of measures for the technical modernization of sources of pollutants into the atmosphere • compliance with the requirements of national legislation in the field of environmental protection • training of the company's personnel and maintaining their awareness • reporting on the results of measurements of atmospheric pollution levels • reporting on the results of monitoring the emission values at the sources

Table 9.1.9. Air Impact Assessment Results Matrix,

Stage of the life cycle: construction

Recipient: population

Recipient sensitivity: average

Characteristics of impacts

Impact	Chemical pollution of the atmosphere on the territory of residential buildings and territories with standardized quality indicators of environment		**Orientation**	**Genesis**	**Mechanism**
			Negative	Direct	Cumulative
Primary impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Short-term	Reversible	Small	Low
Consequences	Violation of the living conditions of the population (influence on the respiratory organs), indirect effects on flora and fauna, soils				
Measures	• Planning solutions (removal of the construction site from residential areas) • organization of construction in strict accordance with the planning, technological and technical solutions of the project • carrying out work in accordance with good practice, compliance with the rules of work, the involvement of personnel with the necessary qualifications for the production of work • monitoring of the technical condition of engines and exhaust systems of cars, bulldozers, excavators, cranes to exclude the operation of equipment with increased emissions of pollutants • exclusion of the operation of car engines and construction equipment at a time when work is not being done implementation of measures for technical modernization of existing sources of emissions of pollutants into the atmosphere				
Residual impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Short-term	Reversible	Minor	Negligible

Life cycle stage: operation

Recipient: population

Recipient sensitivity: average

Characteristics of impacts

Impact	Chemical pollution of the atmosphere on the territory of residential buildings and territories with normalized environmental quality indicators		**Orientation**	**Genesis**	**Mechanism**
			Negative	Direct	Cumulative
Primary impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Long-term	Reversible	Medium	Moderate
Consequences	Violation of the living conditions of the population (influence on the respiratory organs), indirect effects on flora and fauna, soils				
Measures	• organization of a sanitary protection zone. • Organization of the production process using the latest combined cycle gas plant and other equipment.				
Residual impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Domestic	Long-term	Reversible	Small	Low

Sources

1. The Law of the Republic of Uzbekistan “On the Protection of Atmospheric Air”, 1996
2. SanR&N of the Republic of Uzbekistan No. 0293-11 Hygienic standards. List of maximum permissible concentrations (MPC) of pollutants in the atmospheric air of populated areas on the territory of the Republic of Uzbekistan.
3. Resolution of the Cabinet of Ministers of the Republic of Uzbekistan “On approval of the Regulations on the procedure for the development and approval of draft environmental standards” No. 14 dated on 22/11/2018.
4. IFC. General Environment, Health and Safety Guidelines. General EHS Guidelines.
5. IFC. General Environment, Health and Safety Guidelines. Thermal power plants.

9.2 Assessment of climate change

The adoption of systemic measures to mitigate the effects of climate change is of paramount importance for the Republic of Uzbekistan, as they have a decisive impact on agriculture and water resources, hydropower – the most important sectors of the country's economy.

9.2.1 Greenhouse gas emissions

9.2.1.1 The national context

Uzbekistan is a party to the following international treaties in the field of combating climate change:

- United Nations Framework Convention on Climate Change (1992) – since 1994;
- Paris Agreement on Climate Change (2015) – from 2017

In accordance with the Paris Agreement, Uzbekistan undertakes to:

- formulate and publish a long-term development strategy that ensures low greenhouse gas emissions based on national conditions;
- prepare and implement national climate adaptation plans;
- encourage innovation – the development and transfer of appropriate technologies;
- carry out the preparation of reports, including the preparation of National communications, biennial reports, etc.;
- ensure international cooperation on climate change issues, including the development of early warning systems; emergency preparedness, assessment and management of climate risks, etc.

In order to fulfill the obligations under the Paris Agreement, Presidential Decree PP-4477 dated 04.10.2019 developed and adopted a "Strategy for the transition of Uzbekistan to a "green" Economy for the period 2019-2030".[2]

In recent years, together with development partners (UNDP, the World Bank, FAO, ADB, etc.), efforts have been made in the republic to promote the "green" agenda.

Uzbekistan implements the provisions of the Strategy through the implementation of the activities of the "roadmap" until 2030. Immediate tasks:

- twofold increase in energy efficiency indicators;
- reducing the "carbon intensity" of gross domestic product;
- development of renewable energy sources (hereinafter referred to as RES), bringing their share to 25% of the total volume of electric energy generation;
- ensuring access to modern, inexpensive and reliable energy supply for 100% of the population and all sectors of the economy;
- modernization of the infrastructure of industrial enterprises, ensuring their sustainability by increasing energy efficiency by at least 20%;
- expansion of production and use of motor fuels and motor vehicles with improved energy

[2] The implementation of an ambitious plan, comparable in terms of set goals with plans for the transition to "green" energy in economically developed countries, first of all, depends on government policy and financial capabilities, since such projects are carried out using state regulatory mechanisms (subsidies, control over electricity tariffs for different consumer groups).

efficiency and environmental friendliness characteristics;

- development of electric transport;
- improving the efficiency of water use in all sectors of the economy.

The Republic of Uzbekistan has also adopted regulatory legal acts that promote the introduction of technologies and industries that reduce greenhouse gas (GHG) emissions.

The Law “On the Use of Renewable Energy Sources” and the law “On Public-Private Partnership” (2019) create a regulatory framework for the implementation of renewable energy projects:

- It is planned to increase the share of electricity production using renewable energy sources to the level of 25% by 2030 y.;7
- It is planned to build new renewable energy facilities with a total capacity of 10 GW (5 GW solar, 3 GW wind and 1.9 GW hydroelectric power plants).8

For the first time in Uzbekistan, a solar power plant with a capacity of 100 MW has been launched, which will save up to 80 million cubic meters of natural gas annually and prevent about 160 thousand tons of greenhouse gas emissions.[3]

Energy saving measures will reduce the consumption of primary energy, mainly natural gas. The planned investments in energy efficient solutions and renewable energy sources have a high priority, first of all, in terms of reducing GHG emissions.

Mitigation and adaptation measures to the effects of climate change are also reflected in the country’s sectoral strategies, plans and development programs, in particular, in the following documents:

- Innovative Development Strategy for 2019-2021;
- Solid Waste Management Strategy for the period 2019-2028,
- Agricultural Development Strategy for 2020-2030,
- The concept of environmental protection until 2030,
- The concept of providing electric energy for 2020-2030, etc.

To mitigate the effects of climate change, 15 Clean Development Mechanism (CDM) projects have been implemented under the Kyoto Protocol. During the period of the CDM projects in Uzbekistan, 15.3 thousand tons of certified CO2 emission reductions were put into circulation and foreign private investments in the amount of 24.4 million US dollars were attracted. Measures and actions aimed at saving energy resources have allowed Uzbekistan to stabilize the level of greenhouse gas emissions and reduce the country’s contribution to global emissions.

According to the Paris Climate Agreement, Uzbekistan has committed to reduce by 2030 the specific emissions of greenhouse gases (carbon dioxide, methane, nitrous oxide) per unit of GDP by 10% from the base 2010 level. The reduction is planned to be achieved through measures to develop alternative energy, increase energy efficiency and other measures announced in the Strategy for the Transition to a “green” economy.

In 2021, Uzbekistan’s first biennial updated data report containing information on greenhouse gas emissions for 1990-2017 was published on the website of the United Nations Framework Convention on Climate (UNFCCC). The total greenhouse gas emissions in 2017 amounted to 189.2 million tons of CO2-eq. (excluding acquisitions). In 1990-2017, the volume

[3] Due to the dependence of wind and solar power plants on the season of the year, time of day and weather conditions, the average (daily annual) production of renewable energy of this type is significantly lower than the production of thermal and nuclear power plants with equal installed capacity of generating equipment.

of GHG emissions increased by 6.7%, in 2013-2017, on the contrary, a decrease in this volume by 0.6% was noted [1].

The main contribution to greenhouse gas emissions is accounted for by the energy sector – 76.3% and agriculture – 17.8%.

The current goal in the republic provides for a reduction in specific greenhouse gas emissions per unit of GDP by 35% by 2030 from the level of 2010 (instead of the previously envisaged 10%).

By 2030, it is planned to generate 25% of the country's electricity from renewable energy sources, double the energy efficiency of GDP, modernize the infrastructure of industrial enterprises, ensuring an increase in their energy efficiency by at least 20% and the widespread use of "clean" technologies, achieve a neutral balance of land degradation [2].

Thus, it can be concluded that Uzbekistan's accession to the Paris Agreement initiated the development and adoption of strategic-level documents, analysis and assessment of climate change, including those related to greenhouse gas emissions, at the national level.

The strategy for the transition to a "green" economy for the period up to 2030 sets the main goal of achieving sustainable economic growth that promotes social development and reduces greenhouse gas emissions, and increases the climate and environmental sustainability of the economy. The strategy provides for the creation of a monitoring, reporting and verification system (MRV) on greenhouse gas emissions, taking into account national circumstances, to continuously monitor the fulfillment of the country's quantitative obligations under the Paris Agreement and ensure reporting on greenhouse gas emissions.

However, currently there are no national regulatory legal acts and methodological documents applicable by business entities at the operational level in relation to:

- GHG emission estimates;
- requirements for the relevant reporting and its verification;
- defining measurable goals and setting targets for GHG emissions management;
- development of a set of appropriate measures and/or Action Plans;
- GHG monitoring and/or climate indicators.

Accordingly, the GHG emissions assessment for the project corresponds to the national agenda and trends, but its nature is largely determined by the requirements of the investment project.

Sources

1. The first biennial report on updated data of the Republic of Uzbekistan, 2021
2. The Republic of Uzbekistan Updated nationally determined contribution. Report on Decisions of the Conference of the Parties to the Framework Convention on Climate Change 4/CMA.1, 1/CP.21, 9/CMA.1 and 18/CMA.1, 2021

9.2.1.2 Assessment of greenhouse gas emissions at the stage of operation of a combined-cycle power plant

The impact is determined by emissions of greenhouse gases into the atmosphere. In accordance with the global standard for accounting for greenhouse gas (GHG) emissions, the Greenhouse Gas Protocol, [4]GHG emissions of the following "levels" can be accounted

for/scope"(scope):

- Level 1 (Scope 1) – direct GHG emissions produced by an organization: as applied to an enterprise. – emissions associated with fuel combustion, with freon emissions.
- Level 2 (Scope 2) – indirect GHG emissions associated with electricity purchased from third-party producers.
- Level 3 (Scope 3) [5]– indirect emissions associated with the extraction and production of purchased materials, fuel and services, including transportation on vehicles not owned by the enterprise. Emissions of this category are the result of the company's activities, but originate from sources that do not belong to it, and, accordingly, are not controlled by the enterprise. Scope 3 is optional for accounting and reporting[6], but it gives the company the opportunity to become one of the leaders in the field of GHG management;

The quantitative determination of GHG emissions is carried out by the calculation method for individual sources, groups of sources or the organization as a whole using the formula:

Eghg = EF * FC, where:

- E_{ghg} - emissions of CO_2 (and other GHGs), t CO_2;
- FC - fuel consumption, thousand m^3, (for level 1), volume of consumed (purchased) electricity, MWh (for level 2);
- EF is the coefficient of CO2 emissions from fuel combustion, tons of CO2/thousand m3 of gas (for level 1), from purchased electricity, tons of CO2/MWh.

The calculation uses data provided by the Customer: consumption of natural gas, motor fuels, freons, electricity consumption, and other design data.

The results of the assessment of greenhouse gas emissions as a result of the plant's activities are presented in Table 9.2.1.

Table 9.2.1 Greenhouse gas emissions from the company's activities, thousand tons of CO2 equivalent/year [2, 3]

Characteristics	Emissions of 1st and 2ng coverage
Emissions related to the combined cycle power plant construction project	1430

Greenhouse gas emissions generated as a result of the company's activities are significantly lower than the industry average due to the use of the latest combined cycle gas plant for electricity generation. The construction time of a combined-cycle gas power plant is much shorter than the construction time of traditional thermal power plants of other types. At the same time, the transition to a combined-cycle gas cycle makes it possible to improve the environmental performance of the plant and significantly reduce the level of harmful emissions into the atmosphere.

The total electrical efficiency of the proposed CCGT is 61%. The CCGT in question

[5] It was not considered in the framework of this study. In the future, it is advisable to assess level 3 emissions based on an analysis of the procurement and supply chains, a set of activities (based on the impact on the business and the amount of reliable information).

[6] A joint project of the World Resources Institute and the World Business Council for Sustainable Development. https://ghgprotocol.org/

belongs to a relatively new type of power plant powered by natural gas. Combined-cycle gas units are designed to produce the maximum amount of electricity (primary and secondary from hot exhaust gases).

Since the estimated emissions of coverage 1 and 2 exceed 100,000 tons of CO2 equivalent per year, the ways to further reduce the formation of greenhouse gases generated from the company's activities are discussed below.

9.2.1.3 *Ways to reduce the amount of greenhouse gas generation*

9.2.1.3.1 Conceptual approach

When planning measures, it is advisable to proceed not only from the prevention/minimization of emissions, but also consider the possibilities of compensatory measures.

GHG emission management includes a set of solutions, the main ones are:

- implementation of economically sound measures to prevent and/or reduce GHG emissions, including the introduction of energy and resource conservation measures at the enterprise itself;
- monitoring and reporting.

It should be noted that GHG emissions management, in addition to the obvious contribution to achieving carbon neutrality of the economy of the Republic of Uzbekistan, is ultimately aimed at minimizing climate change.

Switching to renewable energy sources

The power supply of the power plant is planned at the expense of the electricity produced at the enterprise.

The company will also produce thermal energy in its own boilers using natural gas.

Natural gas is a non-renewable energy source, the extraction and subsequent combustion of which is associated with the release of greenhouse gases into the atmosphere. To reduce greenhouse gas emissions, it is advisable to consider the possibilities of using renewable energy sources for economic and administrative purposes.

A promising source of renewable energy in the Republic of Uzbekistan is solar energy. The gross potential of solar radiation is estimated in the range from 525 billion kWh to 760 billion kWh, while more than 70% of the country's territory is suitable for the construction and installation of solar power plants.

Thus, the installation of solar panels at the enterprise will reduce the amount of GHG, when using this energy for economic purposes and the operation of the enterprise.

Greenhouse gas absorption

Along with prevention/By reducing GHG emissions, the absorption (runoff) of greenhouse gases from the atmosphere can make a certain contribution to the prevention of climate change. Currently, only one effective way is actually available to increase the volume of biogenic greenhouse gas runoff – the absorption of carbon dioxide by forests/green spaces of young age.

It is advisable for Cenergo LLC to implement a greening program for the territory of the power plant and adjacent territories after the completion of the construction of the power plant. Along with GHG absorption, the creation of green spaces can improve the microclimate.

9.2.1.4 *Assessment results*

Proposals for activities, monitoring and reporting are presented in Table 9.1.8.

The matrix of the results of the assessment of environmental impacts associated with GHG emissions is shown in Table 9.2.5.

It was found that the significance of the impacts of the planned activities related to GHG emissions is estimated as moderate, the significance of the residual effects, taking into account the proposed measures to prevent, minimize and compensate GHG emissions, is also estimated as low[7].

[7] Assessment for the operational stage.

Table 9.2.4. Measures to prevent and mitigate impacts related to greenhouse gas emissions

Item	Activity/ process	Task	Measures	Applicable requirements[8]	Monitoring	Implementation method/ reporting
I.	**Operational stage**					
1.	• The main production process • Provision of basic production activities • Transport and logistics (delivery of raw materials, fuels and lubricants, shipment of products, other transportation)	• Prevention and minimization of GHG emissions • Compensation of the company's contribution to the formation of "carbon footprint"	• Development of GHG emission management systems (policy, procedures, • resources, monitoring, reporting) • Using renewable energy resources • Improving the energy efficiency of production and heat recovery • Implementation GHG absorption projects (landscaping of the plant's territory and adjacent territories)	• IFC General EHS Guidelines, section 1.1 • IFC Guidelines on EHS for Metallurgical plants, section 1.1 • ISO 14064-1:2018 Greenhouse Gases – Part 1: Specification with Guidance at the Organization. Level for Quantification and Reporting of Greenhouse Gas Emissions and Removals • ISO 14064-2:2019 Greenhouse Gases – Part 2: Specification with Guidance at the Project Level for Quantification, Monitoring and Reporting of Greenhouse Gas Emission Reductions or Removal Enhancement • ISO 14064-3:2019 Greenhouse Gases – Part 3: Specification with Guidance for the Verification and Validation of Greenhouse Gas Statement • ISO 14067:2018 "Greenhouse gases - Carbon footprint of products - Requirements and guidelines for quantification"	• Monitoring the implementation of measures to reduce GHG emissions (monitoring procedures may include schedules, roles and responsibilities, equipment, resources and methods for providing, evaluating, measuring, calculating, summarizing and analyzing relevant data)	• Inventory of sources and quantification of GHG emissions of the enterprise (Scope 1,2,3) • Assessment of the carbon footprint of products and measures to reduce GHG emissions: assessment of the effects of software as a result of the implementation of measures • Preparation of the "carbon reporting" of the enterprise

[8] The main guidance documents are presented. As a rule, other documents are used during the GHG inventory, for example, GHG Protocol Corporate, GHG Protocol Scope 3, GHG Calculation Tools, IPCC Guidelines for National Greenhouse Gas Inventories, etc.

Table 9.2.5. Matrix of environmental impact assessment results related to GHG emissions

Life cycle: operating

Recipient: Atmospheric air (climatic conditions)

Recipient sensitivity: medium

Characteristics of impacts

Impact	Climate impacts related to GHG emissions		**Orientation**	**Genesis**	**Mechanism**
			Negative	Direct	Cumulative
Primary impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Regional	Long-term	Reversible	Medium	Moderate
Consequences	Violation of the living conditions of the population (through environmental factors affecting physiological processes), effects on flora and fauna, soils, indirect effects on the economy (industry and agriculture)				
Activities	• Development of a GHG emission management system (policies, procedures, resources, monitoring, reporting) • Implementation of GHG absorption projects (landscaping of the territory of the plant and adjacent territories) • Using renewable energy resources				
Residual impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Long-term	Reversible	Small	Low

9.2.2 Climate risk assessment

In terms of the probability of occurrence and the expected amount of losses, climate risks (CD) are among the most significant, threatening the global economy both now and in the coming decades [11].

The CD includes the risks of extreme weather events, as well as the risks that the economy will not be able to effectively minimize the effects of climate change and/or adapt to them, and the risks of natural disasters.

The sectors of the economy most affected by extreme weather events and natural disasters usually include agriculture, fishing, food industry, construction, trade, energy, tourism and transport.

The efforts of the world community to combat climate change have led to the emergence of problems that are not related to extreme events and/or long-term dynamics of climatic characteristics, but have become a consequence of the adoption of the "green agenda" in the economy. Examples of such risks include banning or restricting investments in carbon-intensive industries that have an impact on climate change.

Thus, taking into account the above, as well as taking into account the results of the assessment of GHG emissions (see Section 9.2.1) there are obvious prerequisites that the project may face climate risks. It is advisable to consider exactly how the “climate agenda” may affect the planned activities.

9.2.2.1 Regional context

9.2.2.1.1 General Information

According to the Global Climate Risk Index (2022), Uzbekistan is not among the countries most affected by climate change, however, the geographical location and dependence of the country’s economy on agriculture makes the country vulnerable to the effects of global warming [10].

The estimated rate of warming in Uzbekistan exceeds the projected global average temperature increase. According to the country’s Climate Risk Profile prepared by the World Bank and the Asian Development Bank, it is assumed that average temperatures in Uzbekistan will increase by 5.6°C by 2090 compared to temperatures in 1986-2005 [4].

In the period from 1950 to 2013, the temperature in Uzbekistan increased by an average of 0.27 °C per decade. The range of average annual temperatures in Uzbekistan decreased over the same period, while the average minimum air temperature increased by 2.0 °C, the average maximum temperature increased by 1.6 °C between 1950 and 2013, the number of hot days and nights is increasing, the daily temperature in summer can exceed 48°C.

Uzbekistan is one of the twenty most drought-prone countries in the world [4]. Uzbekistan’s arid climate and high temperatures make drought an increasingly regular occurrence: on average, one drought was observed every five years in the 1980s and 1990s and four droughts have already occurred between 2000 and 2012.

The rivers of Uzbekistan, the Jizzakh reservoir and the Sanzar River (the power source of this reservoir), on which, ultimately, the water supply of the enterprise depends, suffer from unstable nutrition: climate warming leads to a reduction in snow cover and an increase in water evaporation in catchment areas in the mountains.

A significant increase in the duration and extent of droughts in Central Asia is predicted by the end of this century at a global warming level of 1.5°C, 2.0°C and 3.0°C [4].

Droughts of this magnitude, which are currently extremely rare in Central Asia (100-year droughts), are projected to become 4-10 times more frequent under the same warming scenarios.

The drought in Uzbekistan in 2000 and 2001 led to severe economic and social consequences due to the loss of agricultural products and the impact on the health of residents.

In general, settlements and important infrastructure can be affected by abnormal heat in summer and floods in spring.

The analysis of changes in the average monthly air temperature over a thirty-year observation period (1988-2018) according to the Jizzakh weather station shows a tendency for its increase (Figure 9.2.1).

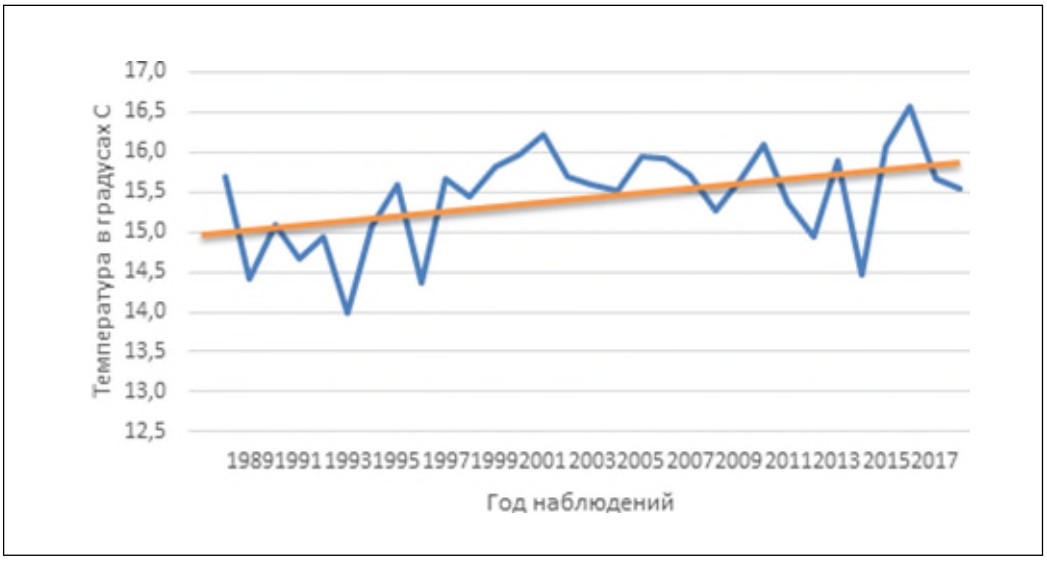


Figure 9.2.1 Average monthly air temperature (°C) for the period 1988-2018 according to the Jizzakh weather station [7]

9.2.2.1.2 CCKP Climate Change Forecast

Most of the current climate risks are determined mainly by the trend of global warming.

For the environmental and social assessment of the planned activities, the World Bank has created and maintains a special website on the Internet – a Portal of knowledge about climate change. [9]The portal uses CMIP5 (Coupled Model Inter-comparison Project Phase 5) models of the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC/AR5 IPCC) as initial data.

These models provide an assessment of changes in temperature and precipitation. The forecast includes four main representative concentration trajectories (RCP/RTK) – RTK2.6, RTK4.5, RTK6.0 and RTK8.5, determined according to the level of total radiation exposure (cumulative GHG emissions from all sources) by 2100. The main focus is usually on RTK2.6 and RTK8.5 – variants of the “lowest” and “highest” GHG emissions, where RTK2.6 represents an effective scenario for mitigating the negative effects of GHG emissions, and RTK8.5 assumes a “business as usual” scenario. Other scenarios are also being considered, for example RTK1.9 is an option that limits global warming to below 1.5°C, the target parameter of the Paris Agreement.

Climate forecasts based on CCKP materials for the Republic of Uzbekistan are

[9] World Bank Group’s Climate Change Knowledge Portal (CCKP), https://climateknowledgeportal.worldbank.org/

presented in [14]. These datasets are the results of simulations performed using various General Circulation (GCM) models.

Due to differences in how GMCS represent key physical processes and interactions in the climate system, the results can vary greatly, especially with regard to precipitation forecasts on a national and local scale.

For the Republic of Uzbekistan, CMIP5 models show a trend of steady warming, regardless of GHG emission scenarios, while precipitation forecast varies greatly, despite the absence of statistically significant changes over the past decades [14].

An increase in the intensity of extreme precipitation seems very likely.

The tables Table 9.2.6, Table 9.2.7 provide information on the temperature forecast for four RTCs and two time intervals in relation to the base period 1986-2005 [14, 15].

Table 9.2.6 Forecast of changes in the maximum, minimum and average daily temperature in Uzbekistan compared to the period 1986-2005.

RTC	Average daily maximum temperature		Average daily minimum temperature		Average daily temperature	
	2040-2059 yy.	2080-2099	2040-2059 yy.	2080-2099 yy.	2040-2059 yy.	2080-2099 yy.
RTC 2.6	1.5 (−0.5, 3.8)	1.5 (−0.5, 3.6)	1.4 (−0.2, 3.4)	1.3 (−0.3, 3.3)	1.4 (−0.4, 3.3)	1.3 (−0.5, 3.2)
RTC 4.5	1.9 (0.1, 4.1)	2.7 (0.7, 4.9)	1.8 (0.2, 3.7)	2,6 (0.7, 4.6)	1.9 (0.0, 3.9)	2.5 (0.4, 4.7)
RTC 6.0	1.8 (0.0, 3.7)	3.4 (1.4, 5.7)	1.6 (0.0, 3.5)	3.2 (1.5, 5.3)	1.6 (−0.2, 3.4)	3.0 (1.2, 5.2)
RTC 8.5	2.5 (0.5, 4.8)	5.4 (3.2, 7.8)	2.5 (0.7, 4.5)	5.3 (3.3, 7.4)	2.5 (0.6, 4.6)	5.2 (3.1, 7.5)

Note: The median of CCKP models and the 10th-90th percentile are shown in parentheses.

Table 9.2.7 Forecast of changes in the average temperature in Uzbekistan by season compared to the period 1986-2005 for various RTCs

RTC	2040-2059 yy.		2080-2099 yy.	
	June-August	December-February	June-August	December-February
RTC 2.6	1.6 (−0.2, 3.6)	1.6 (−0.2, 3.9)	1.5 (−0.6, 3.5)	1.5 (−0.2, 3.7)
RTC 4.5	2.1 (0.2, 2.4)	4.9 (0.2, 3.8)	2.9 (0.9, 5.2)	2.7 (1.1, 4.7)

RTC	2040-2059 yy.		2080-2099 yy.	
	June-August	December-February	June-August	December-February
RTC 6.0	1.8 (0.3, 3.5)	1.8 (0.0, 4.0)	3.7 (1.7, 5.7)	3.3 (1.5, 5.4)
RTC 8.5	2.9 (0.9, 4.9)	2.3 (0.4, 4.3)	6.0 (3.7, 8.4)	4.9 (3.3, 6.4)

Note: the median results of the evaluation of the CCKP model complex, and 10-90 percentiles (in parentheses) are given

The forecast of changes in average temperature and annual precipitation in Uzbekistan for RTC8.5, generalized by 16 GCM, is shown in Figure 1.

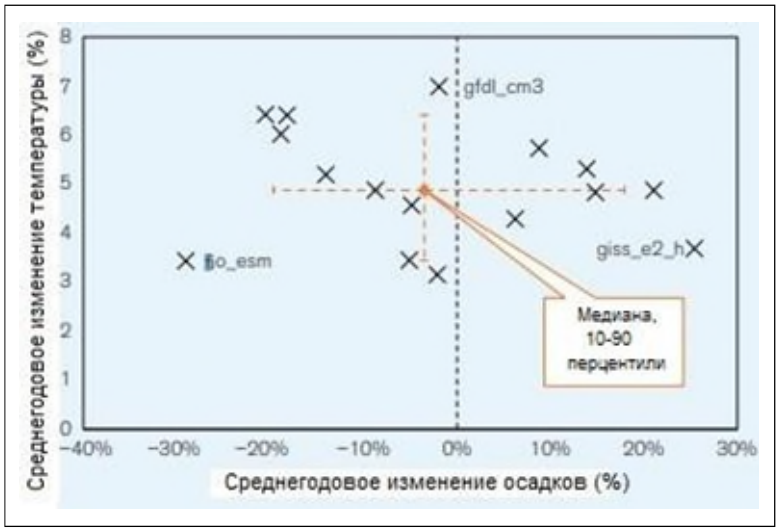


Figure 9.2.2 Forecast of changes in average temperature and annual precipitation in Uzbekistan. Three models are indicated by labels [10]

As shown in Figure 1, the forecasts of individual models can range from a reduction in annual precipitation by almost 30% to an increase of 20%.

Although significant uncertainty characterizes long-term precipitation forecasts, some trends are obvious.

Cartographic interpretation of the mid- to late-21st century mean annual temperature and precipitation forecasts for RCP8.5 is shown in Figure 9.2.3.

[10] The results of 16 models as part of a complex simulating RCP8.5 for the period 2080-2099.

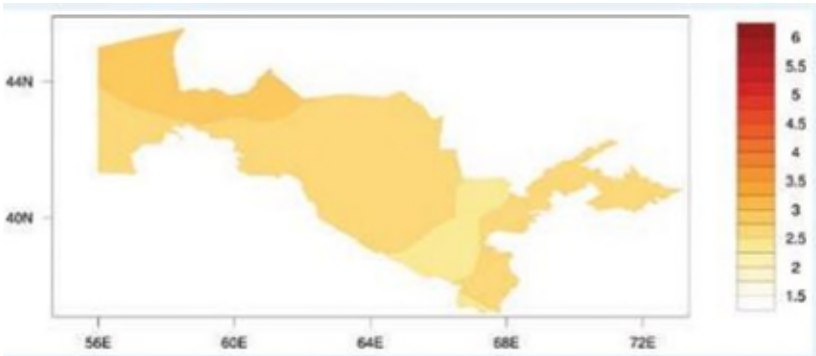
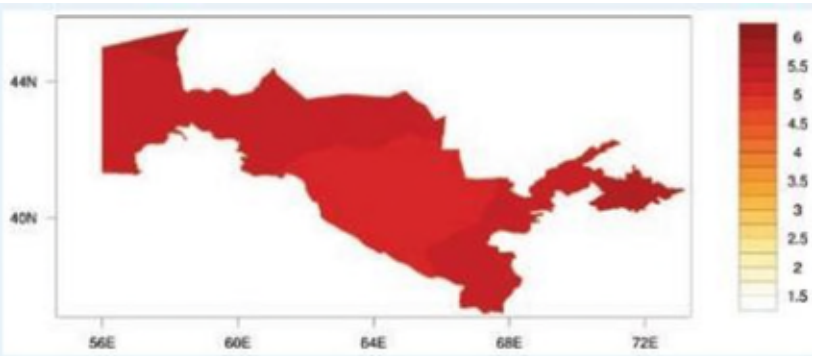
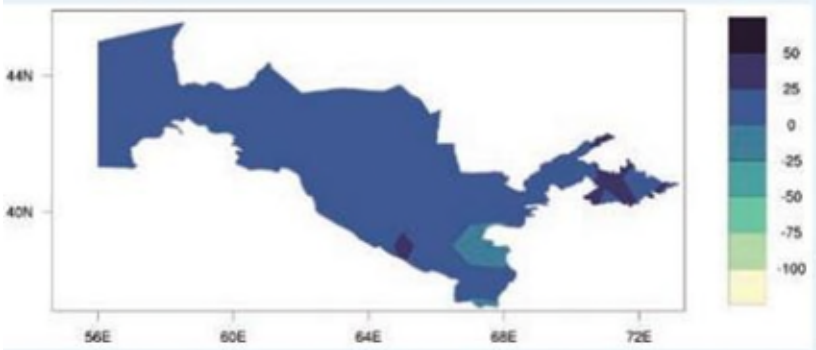
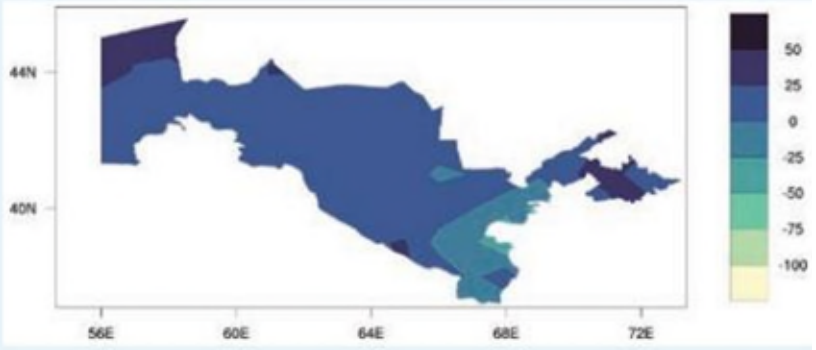
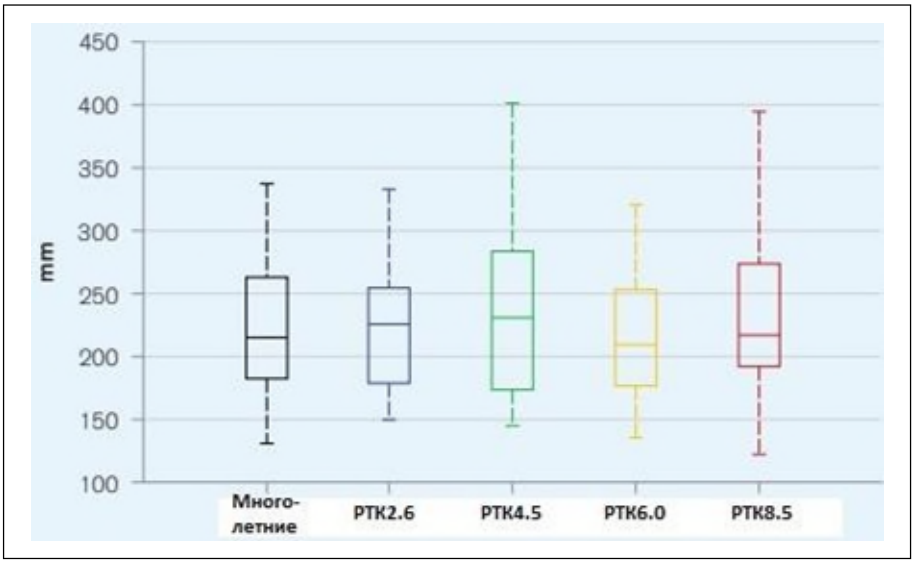
	2040–2059	2080–2090
Changes in the average annual temperature		
Changing the amount of precipitation		

Figure 9.2.3 CMIP5-forecast of changes in average temperature and precipitation compared to the baseline level of 1986-2005 for RTC/RCP8.5 [15]

It was noted above that CCKP models do not reflect an unambiguous trend in the average annual precipitation in the republic, – there is uncertainty even in the direction of changes, – this is typical for all four RTCs and different time intervals (Figure 9.2.4).

Figure 9.2.4 Projected average annual precipitation for Uzbekistan in the period 2080-



2099 for various RTCs [16]

The intensity of extreme rains falling in less than a day seems to increase with increasing temperatures.

CCKP models suggest that in Uzbekistan, the total amount of precipitation falling during an extreme 5-day downpour may increase slightly (0-20% depending on the RTC). However, it is assumed that the probability of intense precipitation is largely determined by the local features of the underlying surface [14].

In addition to the general climate changes associated with greenhouse gas emissions discussed above, it is necessary to take into account natural risks depending on climatic conditions.

In general, Uzbekistan has an average global disaster risk rating, ranking 112th out of 191 countries according to the INFORM rating. The country's risk assessment is increasing due to its very high earthquake susceptibility: with an estimate of 9.9 out of 10, Uzbekistan ranks second in the world. However, this factor has no connection with the climate.

The country is also among the top 20 countries in the world in terms of exposure to drought, Uzbekistan faces a high risk of forest fires. The flood hazard level in Uzbekistan is above average. These estimates are offset by relatively low Vulnerability levels and moderate levels of preparedness to respond (Lack of Coping Capacity) (Table 9.2.8).

Table 9.2.8 Selected indicators of the Natural Risk Management Index for Uzbekistan (INFORM 2019)

Floods (0-10)	Tropical cyclones (0–10)	Droughts (0-10)	Vulnerability (0-10)	Readiness to respond (0–10)	Overall rating (0–10)	Place in the ranking (1–191)
6.3 (4.5)	0.0 (1.7)	6.6 (3.2)	1.9 (3.6)	4.0 (4.5)	3.1 (3.8)	112

Note: For certain risk categories, higher scores represent higher risks, and conversely, the country with the highest risk ranks 1st. Global average scores are shown in parentheses.

For the purposes of this assessment, the World Bank's electronic resource ThinkHazard! was also used (see https://thinkhazard.org/en/).

This resource provides information about the natural hazards of the region, which should be taken into account when evaluating and implementing planned activities to increase resilience to natural disasters and climate change [17].

The tool contains an assessment of the probability of various natural disasters in the region under consideration (very low, low, medium and high) and provides recommendations on reducing the corresponding risks. The assessment of hazard levels is based on published hazard data, as well as data provided by a number of private, academic and public organizations.

For the city of Jizzakh, the ThinkHazard resource! provides the following estimates of phenomena caused directly or indirectly by climatic processes:

- floods are a high risk;
- earthquake is a high risk;
- landslides are a high risk;
- fires are a high risk;
- water shortage is an average risk;
- flooding in the city is an average risk;
- extreme heat is an average risk.

9.2.2.2 Assessment methodology

Climate risks are systematically identified in the documents of the Task Force on Climate Related Financial Disclosures (TCFD), the Group of 20 Financial Stability Board (FSB), as well as through the work of various associations and regulators. Since 2017 The TCFD recommendations have essentially become the international standard for disclosing information about climate-related financial risks.

In 2021, The Working Group updated the 2017 Disclosure Guidelines, the structure of the recommendations has been preserved, but now organizations will have to disclose relevant information regardless of the assessment of the materiality of GHG emissions [1].

TCFD notes that more and more countries recommend or oblige the use of the organization's standards for the disclosure of ESG information. In 2021, 2,600 companies worldwide adhere to the TCFD recommendations (compared to 1,500 a year earlier).

The purpose of implementing the TCFD recommendations is to develop tools (measures) to disclose information about corporate risks that arise in connection with global climate change in order to improve awareness

stakeholders and increase the transparency of investments, loans and insurance.

The TCFD recommendations help to develop an effective and unified reporting system for disclosing information on the impact of climate change risks on an organization's business and suggest using the following categorization of climate risks:

- physical risks are risks associated with natural phenomena arising from climate change. Physical risks are divided into:
  - emergency/acute risks (acute risk) associated with sudden events;
  - systematic risks (chronic risk) associated with long-term climate change;
- transition risks – the risks associated with the transition to a "low-carbon" economy, which are divided into:
  - regulatory – political and legal (policy and legal risks);
  - technology risk;
  - market risk;
  - reputation risk.

Physical risks arising from damage and/or other losses from physical natural phenomena are associated with both long-term climatic trends (for example, changes in weather conditions) and sudden, emergency events (natural disasters, extreme weather conditions).

For the conditions of the area of the planned activity, the physical risk may be associated with abnormal heat, to a lesser extent with floods.

Uninsured losses resulting from physical risks can put an additional financial burden on the enterprise and potentially lead to negative consequences in the supply chain and even have an impact on insurers and banks financing projects (in particular, the project for the construction of a combined–cycle power plant).

The risks of transition are associated with the movement of economies towards a "low-carbon" economy, determined by a decrease in the level of use of hydrocarbons and/or other natural resources, as well as an increase in the share of renewable energy sources.

The transition to a "green" economy generates political, legal, technological and market changes due to the emergence of requirements for the prevention/minimization of climate change and adaptation to them.

Examples of transition risks recognized by regulators and the banking community are policy and regulatory reforms in relation to "carbon-intensive" industries. It is obvious that the activity of the power plant is characterized as significant in relation to the carbon footprint, as shown in Section 9.2.1.

Such changes can significantly affect investment processes and insurance. At the same time, civil and public activity aimed at refusing to support the relevant industries can cause reputational damage.

The risk of transition can be realized for the enterprise in relation to the appearance of new taxes and fees related to hydrocarbon emissions, restrictions on cooperation with companies that do not take into account ESG factors, for banks and insurance companies.

It is important to note that the process of transition to a “green” economy has a long–term character - negative consequences are unlikely to affect the company’s activities in a significant way in the short term (especially given the lack of developed regulation of this area at the national level). Nevertheless, banks, investment companies, and the insurance business are taking measures to adjust the requirements for borrowers accordingly, which may have an impact on the company’s investment plans.

It should be noted that the consequences for the banking and insurance community, investment projects and business entities themselves are formed not only by these risks – climate change, institutional reforms form appropriate opportunities, among them:

- the benefits of using “low-carbon” energy sources;
- access to new markets;
- advantages of “green financing”;

9.2.2.3 *Characteristics of climate risks*

Physical risks

Physical risks are risks directly related to climate change in the region of the company’s presence and the resulting natural and man–made phenomena.

The characteristics of the physical climate risks for the project are presented in Table 9.2.9.

Table 9.2.9 Physical climate risks

Risk	Description of the risk	Time period	An optimistic scenario, RTC1.9	A balanced scenario, RTC2.6	A pessimistic scenario, RTC8.5	Impact on financial indicators	Possible prevention/ risk mitigation measures
Emergency risks							
Droughts and fires	- Lack of water resources necessary for production processes - damage to property (equipment) - economic consequences of drought for the country's economy as a whole and indirect impact on the power plant	Short-term, Medium-term	Average probability	High probability	High probability	High damage	- Closed loop of water consumption - elimination of water losses - usage of underground (drainage) water resources -improvement of the system of fire protection regulations
Landslides and mudslides	Damage to property	Short-term, Medium-term	Low probability	Low probability	Low probability	Low damage	Not required
Floods	Damage to enterprise property - equipment, buildings, structures, infrastructure (power lines, road network)	Short-term, Medium-term	Low probability	Average probability	Average probability	High damage	- Short-term monitoring of the equalized Jizzakh reservoir and irrigation channels medium- and long-term forecasts of equalized rejime - timely responding to unfavorable forecasts, in particular, – implementation of engineering protective events (if necessary)
Systematic risks							

Risk	Description of the risk	Time period	An optimistic scenario, RTC1.9	A balanced scenario, RTC2.6	A pessimistic scenario, RTC8.5	Impact on financial indicators	Possible prevention/ risk mitigation measures
Air temperature rise	Changing the operating modes (conditions) of the equipment, potentially disrupting the operation оборудования	Medium-term, Long-term	Low probability	Low probability	Low probability	Low damage	Not required
Air temperature rise	Negative impact on staff health	Medium-term, Long-term	Low probability	Medium probability	High probability	High damage	The use of technologies (systems) that ensure the working conditions of personnel corresponding to sanitary standards
Decrease in the flow (water content) of the Jizzakh reservoir	Shortage of water resources for technical water supply	Long-term	Low probability	Low probability	Medium probability	Medium damage	- Diversification of water supply sources - elimination of water losses
Shortage (availability) of fuel and energy resources	Volume reduction and/or production shutdown	Long-term	Low probability	Low probability	Medium probability	High damage	- Diversification of heat and energy supply sources, in particular, the transition to alternative sources for the economic purposes of the enterprise - improving the energy efficiency of production

Transitional risks

Transitional risks are legal, technological, market and reputational risks associated with the transition to a "low–carbon" economy. As a rule, these risks are usually associated with a decrease in the use of hydrocarbons and other natural resources, as well as with the transition of the economy to renewable energy sources.

The possible transitional climate risks of the Project are discussed in Table 9.2.10.

Table 9.2.10 Transitional climate risks of the enterprise

Risk	Characteristic	Consequences
Regulatory risks (carbon taxation and other regulatory changes)	According to the World Bank's forecast, by 2050 half of the formed "carbon-intensive" greenhouse gas industries will be subject to local and global regulatory reforms, including mandatory reporting and carbon taxation	• regulatory, pricing, tax restrictions – increase in the cost of production • rising prices for raw materials and/or reducing availability of such raw materials
Market risk	Introduction of market mechanisms for trading carbon units	• Increased operating costs, increased costs associated with the preparation and verification of climate reports (including GHG emissions) • an increase in the cost of attracting financing and/or /limiting opportunities for growth – an increase in the cost of credit funding
Reputational risks	In the global investment climate, there is a tendency for investors and financial institutions to pay increased attention to environmental and social responsibility of organizations	• Decrease in investment attractiveness

9.2.2.4 Recommendations for adaptation to climate change

9.2.2.4.1 The main directions of adaptation

Detailed recommendations for an enterprise to respond to climate change should be worked out in the appropriate documentation, optimally based on the development (expansion) of the Environmental and Social Management System being created.

The TCFD methodology provides for work in the following main areas:

- Organization. The role of the company's Board of Directors and management in climate risk management should be defined.
- Strategy. Disclosure of the actual and potential impact of risks and opportunities related to climate change on the business processes of the enterprise (development projects).
- Risk management. Methodology of identification, assessment and management of climate risks.
- Purposes. Identification and disclosure of indicators and objectives used to assess and manage climate risks and opportunities.

9.2.2.4.2 Approaches to managing climate risks and opportunities

Involving the top management of the enterprise in managing the climate strategy

Climate change is of global importance for all sectors of the economy, therefore, this external context of the company's activities should be taken into account by the company's development goals and a long-term strategy for creating additional value.

The involvement of the company's Board of Directors, as well as senior management, in decision-making on the company's climate agenda demonstrates the reflection of the company's long-term and systemic attitude to the problem of climate change, including taking into account important aspects in the daily activities of the enterprise.

Climate risks in the enterprise management system

A timely assessment of climate risks will allow the company to adapt to the effects of climate change in advance, in particular, to provide for the allocation of necessary resources to prevent and/or minimize the negative impact of climate change, or, conversely, to maximize changes that can positively affect the company's activities, in particular, have a long-term impact on its financial position.

Identification and assessment of climate risks should be carried out in accordance with applicable requirements

- standards:
  - ISO 14090:2019 Adaptation to climate change – Principles, requirements and guidelines;
  - ISO 14080:2018 Greenhouse gas management and related activities – Framework and principles for methodologies on climate actions;
  - TCFD manuals.

Development of the enterprise's corporate climate strategy and definition of climate goals

The definition of reasonable goals and the introduction of appropriate metrics will clearly demonstrate to the company's staff and stakeholders how and how the company carries out activities in the field of regulating greenhouse gas emissions, as well as implements measures to minimize the negative effects of climate change. Setting specific measurable goals creates the basis for effectively achieving emission reductions within a specific time frame.

The development of a climate strategy and enterprise policy should be based on the study (assessment) of the context of the organization, production processes and risk factors.

The main elements of the company's climate strategy:

- risks associated with climate change;
- requirements for reducing the "carbon footprint";
- monitoring and evaluation of the effectiveness of implemented measures;
- reporting and external communications.

Monitoring and reporting

On a regular (annual) basis, it is recommended to assess greenhouse gas emissions of 1, 2 and 3 coverage in accordance with the requirements of the GHG Protocol, Carbon Disclosure Project and IPCC to monitor the achievement of relevant targets.

9.2.2.4.3 Climate risk management and "carbon footprint" reduction

The ESIA executors conducted an appropriate analysis, the results of which are presented in section 9.2.1.3 of this report (including recommendations).

Sources

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7. Uzhydromet. The average monthly air temperature (°C) for the period 1988-2018 according to the Jizzakh weather station.
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12. https://climateknowledgeportal.worldbank.org/sites/default/files/2021-09/15838-Uzbekistan%20Country%20Profile-WEB.pdf
13. WBG Climate Change Knowledge Portal (CCKP 2021). Uzbekistan Climate Data. Projections.
14. https://climateknowledgeportal.worldbank.org/country/uzbekistan/climate-data-projections
15. WBG Climate Change Knowledge Portal (CCKP 2021). Uzbekistan Agriculture Dashboard.
16. https://climatedata.worldbank.org/CRMePortal/web/agriculture/crops-and-land-management?country=UZB&period=2080-2099
17. WBG web-based tool https://thinkhazard.org/

9.3 Acoustic and vibration effects

At the preliminary assessment stage, the impact of vibration on the population is considered insignificant (see 125-1105-SR, Section 7.10). Preliminary conclusions on the provision of sanitary standards for the level of vibration exposure in residential buildings are confirmed by the measurement data provided in the report 125-1105- BIO-Noise.

Further in this report, only acoustic effects are considered.

9.3.1 Assessment methodology

Calculations were made using the GOST 31295.2-2005 methodology applicable in the Republic of Uzbekistan [1]. The standard is fully harmonized with ISO 9613-2:1996 Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation.

The “Эколог-шум” (Ecologist-Noise) program implements the methodology set out in GOST 31295.2-2005
[1] (ISO 9613-2:1996), in this regard, calculations of noise propagation were carried out using the software “Эколог-шум 2.4.4.6”.

The calculated noise values and their comparison with the permissible levels determined by SanR&N 0267-09 [2] for daytime and nighttime are used as a criterion for assessing the noise impact zone, which fully complies with the Recommendations of the WHO Guidelines for Community Noise, World Health Organization (WHO), 1999 [3].

The calculation results were also compared with the criteria set out in the IFC Environmental Health and Safety Guidelines - Environment 1.7 Noise 2007 [4].

Noise level for areas adjacent to residential buildings and office classrooms:

- it should not exceed 55 dBA for daytime (from 07.00 to 23.00) and 45 dBA for night time (from 23.00 to 07.00) in accordance with the table 1.7.1 of the IFC Guidelines on EHS [4];

  or
- it should not exceed the background values by more than 3 dB.

9.3.2 Construction stage

The main sources of noise at the construction stage of the enterprise will be construction machines, auxiliary mechanisms and vehicles.

The peculiarity of the considered noise sources is their operation in an open space with constant movement on the construction site, while each piece of equipment can operate in different operating modes, which causes the variability, both in time and in space, of the sound energy emitted into the environment. Thus, the noise during the operation of machinery and mechanisms will be characterized by non-constant sound levels in time.

External noise sources include:

- earth-moving equipment (bulldozers, excavators);
- assembly equipment (truck cranes, caterpillar cranes);
- mobile air compressors;
- construction machines and vehicles, forklifts
- automobile and rail transport (delivery of building materials, equipment and construction waste).

To assess the impact of noise, the noise level from noise sources from construction machinery and mechanisms was simulated. The solutions of the analog object, the construction stage, were used as initial data.

The calculation area measuring 4760 m by 6450 m, covering the adjacent residential development, was adopted with a step of the calculation grid of 50 m, height of 1.5 m.

Taking into account the location of noise sources, their acoustic characteristics, radiation direction, as well as the planning situation and regulatory requirements, the design points RT-001 – RT-033, 050, 051, located in residential areas adjacent to an industrial site, railway tracks and a highway, were selected.

The results of the calculated assessment (Table 3.1) show that the noise level at the design points and at the border of the SPZ of the enterprise during the construction period complies with national sanitary standards SanR&N 0267- 09 [2] and WHO Recommendations [3], which indicates compliance with the requirements of the IFC [4].

The table shows the comparative characteristics of the total noise level at the design points for the current situation and the expected noise levels during the construction period, as well as the contribution to the total noise level at the design points from machinery during construction work.

Table 9.3.1 – Noise levels at design points at the construction stage

Number of design points	Noise level (current situation), dBA	Predicted noise level, dBA	The contribution of construction machinery and mechanisms to the acoustic effect on the adjacent to the construction site of the territory, dB
1	33.60	33.70	0.1
2	32.00	34.80	2.8
3	32.70	34.60	1.9
4	32.30	34.50	2.2
5	33.60	34.30	0.7
6	33.20	33.30	0.1
7	32.30	32.30	0
8	35.90	36.40	0.5
9	29.00	29.10	0.1
10	24.40	25.20	0.8
11	37.50	37.80	0.3
12	39.30	39.40	0.1
13	31.60	31.60	0
14	36.70	39.20	2.5
15	36.10	39.00	2.9
16	34.50	37.20	2.7
17	35.00	35.40	0.4
18	40.10	40.10	0
19	36.50	36.50	0
20	41.10	41.10	0
21	38.10	38.30	0.2
22	42.20	42.30	0.1
23	35.50	38.00	2.5
24	35.70	35.80	2.1
25	40.10	40.20	0.1
26	35.50	35.50	0
27	30.20	30.30	0.1
28	33.70	34.40	0.7
29	42.80	43.00	0.2
30	39.10	40.40	1.3
31	41.90	45.00	3.1
32	38.00	40.50	2.5
33	37.50	37.50	0
46	–*	38.70	–*
47	–*	40.60	–*
48	–*	41.00	–*
49	–*	38.40	–*
50	30.60	31.20	0.6
51	47.70	50.80	3.1

From the results presented in the table (Table 9.3.1), it can be concluded that the noise level for the period of construction work exceeds the existing noise level from 0.1 to 3.1 dB (at one point). The predicted noise level at the settlement points does not exceed the regulatory values of the national [2] and IFC requirements [4]. The construction phase of the combined-cycle power plant and vehicles will not significantly change the acoustic environment in the area adjacent to the construction site.

9.3.3 Operational stage

The following significant noise sources were taken into account when predicting the acoustic situation:

- sources of technological noise penetrating from the premises to the territory;
- sources of ventilation noise emitted by the open ends of the ducts;
- sources of traffic noise, determined by the movement of road and rail transport near the territory of the enterprise.

The results of the calculated assessment show that the noise level at the settlement points and at the border of the terminal SPZ at the operational stage meets the selected criteria: national sanitary standards (SanR&N 0267-09 [2]) and WHO Recommendations [3], which indicates compliance with the requirements of the IFC [4], taking into account the implementation of noise protection measures.

Table 9.3.2 presents the expected noise levels after the commissioning of the power plant, as well as the contribution to the total noise level at the design points from the operation of the equipment and the increase in noise from an increase in the intensity of road traffic.

Table 9.3.2. Noise levels at design points at the operational stage

№ of design points	Noise level (current situation), dBA	Predicted noise level, dBA	The contribution of enterprises to the acoustic impact on the surrounding area, dB
1.	33.60	33.60	0
2.	32.00	32.00	0
3.	32.70	32.90	0.2
4.	32.30	32.40	0.1
5.	33.60	33.70	0.1
6.	33.20	33.30	0.1
7.	32.30	32.40	0.1
8.	35.90	35.90	0
9.	29.00	29.00	0
10.	24.40	24.80	0.4
11.	37.50	37.50	0
12.	39.30	39.30	0
13.	31.60	31.60	0
14.	36.70	36.90	0.2
15.	36.10	36.10	0
16.	34.50	34.50	0
17.	35.00	35.10	0.1
18.	40.10	40.20	0.1
19.	36.50	36.50	0
20.	41.10	41.10	0
21.	38.10	38.10	0
22.	42.20	42.20	0
23.	35.50	35.50	0
24.	35.70	35.70	0
25.	40.10	40.10	0
26.	35.50	35.50	0
27.	30.20	30.30	0.1
28.	33.70	33.80	0.1
29.	42.80	43.00	0.2
30.	39.10	40.00	0.9
31.	41.90	41.90	0
32.	38.00	38.00	0
33.	37.50	37.90	0.4
50	30.60	31.20	0.6
51	47.70	49.60	1.9

From the results presented in (Table 9.3.2), it can be concluded that the noise level after commissioning of the enterprise will change the noise level in the adjacent territories by no more than 0.9 dB.

National sanitary standards [2], as well as WHO Recommendations [3] and IFC requirements [4] for daytime and nighttime will be provided at all settlement points, except for territories adjacent to railway tracks (RT 051).

9.3.4 Recommendations

9.3.4.1 Measures to prevent and mitigate impacts

Construction stage

To prevent acoustic effects at the construction stage, the following methods are used:

- planning solutions. The construction site is removed from residential areas;

To mitigate the acoustic impact, the following organizational and technical noise protection measures are recommended:

- organization of construction in strict accordance with the planning, technological and technical solutions of the project;
- carrying out work in accordance with good practice, compliance with the rules of work, the involvement of qualified personnel for the production of work;
- monitoring of the technical condition of bulldozer and excavator engines in order to prohibit the operation of equipment emitting increased noise;
- exclusion of parking of vehicles, bulldozers and excavators with running engines, at a time when work is not carried out;
- speed limit on the access road section is up to 40 km/h.

Operational stage

To prevent acoustic effects at the operation stage, the following methods are used:

- planning solutions. The construction site is removed from residential areas;
- speed limit on the access road section is up to 40 km/h.

The proposed measures comply with the Recommendations [4].

9.3.4.2 Monitoring and reporting

To confirm compliance with national and international standards of acoustic impact, measurements of noise levels at points that simultaneously meet the following conditions are provided:

- the closest approach to the SPZ border;
- the closest approach to the main sources of noise of the enterprise;
- exclusion of the influence of other noise sources that are not related to the enterprise.

To measure the noise level of the enterprise, control points are proposed located on the border of the regulatory SPZ of the enterprise, at a height of 1.2 m with the orientation of the microphone in the direction of the territory of the power plant.

Table 9.3.3. Characteristics of control points of noise and vibration levels

Point No	**Addre ss**	Coordinates	
TCC 1	Entrance to the production site	40.092745	67.939482
TCC 2	The end of the production site near the canal	40.091163	67.948810
TCC 3	Near residential buildings	40.090561	67.946963
TCC 4	Near the gas station	40.090877	67.940344

Monitoring of noise levels is planned to be carried out according to two indicators:

- sound pressure levels in octave bands with mean geometric frequencies of 31.5-8000 Hz;
- the equivalent sound level (sound level), adjusted on the “A” scale.

Taking into account the constant work of a number of departments of the enterprise, noise levels are measured during the daytime and at night, during the operation of the maximum number of equipment that determines the noise emission with the highest levels.

The duration of measurements is taken according to [24] to determine all the necessary normalized noise parameters.

Frequency – at least 4 days of measurements, once every 3 months.

When establishing the excessive impact of noise from the sources of the enterprise on residential areas, corrective actions are taken:

- identification of sources that cause excess of regulatory noise levels;
- development and implementation of additional noise protection measures.

Proposals for monitoring and reporting are presented in Table 9.3.4 (Table 9.3.4).

In addition to measuring noise levels, it is necessary to inspect the construction site (at the stage of operation on an industrial site) in order to monitor the implementation of organizational and technical measures.

9.3.5 Assessment results

Acoustic impact assessment results matrix (characteristic of the acoustic effect) is given in (Table 9.3.5).

Found that the impact of the planned activity on the acoustic environment is assessed as follows22:

- at the construction stage – negligible;
- at the operation stage – low.

Table 9.3.4. Measures to prevent and mitigate acoustic impacts

Item	Activity/ process	Task	Measures	Applicable requirements	Monitoring	Implementation method/ reporting
I.	**Construction stage**					
1.	• Construction works (earthworks, general construction works) • Transport and logistics (delivery of raw materials, fuels and lubricants, other transportation)	• Prevention of acoustic effects on the population • Mitigation of the impact of noise exposure levels on the population	• Planning solutions (removal from residential areas) • the speed limit on the section of the access road is up to 40 km/h • organization of construction in strict accordance with the planning, technological and technical solutions of the project • carrying out work in accordance with good practice, compliance with the rules of work, the involvement of qualified personnel for the production of work, • monitoring of the technical condition of bulldozer and excavator engines in order to prohibit the operation of equipment emitting increased noise • exclusion of parking of vehicles, bulldozers and excavators with running engines, at a time when work is not carried out;	- IFC EHS Section 1.7 Noise - SanR&N 0267-09 - GOST 23337-2014 (ISO 1996-1:2016, ISO 1996-1:2017)	• Measurement of noise levels in adjacent residential areas in accordance with the proposed schedule • inspections at the construction site	• Implementation of environmental management measures in accordance with the project documentation and the construction organization project • compliance with the requirements of national legislation in the field of environmental protection • training of construction contractor's personnel and maintaining their awareness • reporting on the results of noise measurement • reporting on inspection results
II.	**Operational stage**					
1.	• The main production process • Transport and logistics (delivery of raw materials, fuels and lubricants, shipment of products, other transportation,)	• Prevention of acoustic effects on the population • Mitigation of the impact of noise exposure levels on the population • Compensation of acoustic effects on the population	• Planning solutions (removal from residential areas) • the speed limit on the section of the access road is up to 40 km/h • installation of mufflers on ventilation systems	- IFC EHS. Section 1.7 Noise - SanR&N 0267-09 - GOST 23337-2014 (ISO 1996-1:2016, ISO 1996-1:2017)	• Measurement of noise levels in adjacent residential areas in accordance with the proposed schedule • inspections at the industrial site	• Implementation of environmental management measures in accordance with the project documentation and the construction organization project • compliance with the requirements of national legislation in the field of environmental protection • reporting on the results of noise measurement • Reporting on inspection results

Table 9.3.5 Matrix of acoustic impact assessment results

Life cycle stage: construction

Recipient: population

Recipient sensitivity: average

Characteristics of impacts

Impact	Acoustic impact on the territory with normalized environmental quality indicators		**Orientation**	**Genesis**	**Mechanism**
			Negative	Indirect	Cumulative
Primary impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Short-term	Reversible	Small	Low
Consequences	Violation of the living conditions of the population (impact on the central nervous system and psyche)				
Measures	• Planning solutions (removal from residential areas) • organization of construction in strict accordance with the planning, technological and technical solutions of the project • carrying out work in accordance with good practice, compliance with the rules of work, the involvement of personnel with the necessary qualifications for the production of work • monitoring of the technical condition of engines and exhaust systems of cars, bulldozers, excavators in order to prevent the operation of equipment emitting increased noise • exclusion of parking of vehicles and cars with running engines, as well as bulldozers and excavators at a time when work is not carried out • operation of vehicles in a mode that allows vehicles to move without unnecessary loads on the engine and vibrations of the body and cargo • installation of mufflers on existing ventilation systems				
Residual impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Short-term	Reversible	Minor	Negligible

Life cycle stage: operation

Recipient: population

Recipient sensitivity: average

Characteristics of impacts

Impact	Acoustic impact in areas with normalized environmental quality indicators		**Orientation**	**Genesis**	**Mechanism**
			Negative	Direct	Cumulative
Primary impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Long-term	Reversible	Medium	Moderate
Consequences	Violation of the living conditions of the population (impact on the central nervous system and psyche)				
Measures	• Planning solutions (removal from residential areas) • installation of mufflers on ventilation systems				
Residual impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Long-term	Reversible	Small	Low

Sources

1. GOST 31295.2-2005 (ISO 9613-2:1996) “Noise. Sound attenuation during propagation on the ground. Part 2. The general method of calculation”.
2. SanR&N 0267-09 “Sanitary norms and rules for ensuring permissible noise in residential, public buildings and on the territory of residential development”.
3. Guidelines for Community Noise, World Health Organization, 1999.
4. IFC. General Environment, Health and Safety Guidelines (EHS).

9.4 Impacts related to waste generation

The section presents an analysis of the waste management system at the stages of construction and operation of the power plant, as well as recommendations related to this aspect.

The section has been prepared taking into account the requirements of the terms of reference, the national requirements of the legislation of the Republic of Uzbekistan and the requirements of the IFC [1-5].

Recommendations for mitigation of impacts have been developed in accordance with the requirements of the IFC [3-5].

In the process of construction and installation work, mainly construction waste is generated (construction waste, metal scraps, cleaning rags, electrode stubs, and others), as well as solid household and food waste. These wastes belong to hazard classes 4 and 5.

Waste related to the operation of road construction equipment (spent fuel, batteries, tires) is not generated, since the repair of equipment will be carried out outside the construction site - at repair bases or service stations.

9.4.1 Construction stage

During the construction period, the formation of the following waste is predicted at the construction site and at the construction camp site:

- waste of building materials (concrete and reinforced concrete products, building bricks, crushed stone, cement, wood, bitumen, insulating materials, paints and varnishes);
- waste of soils, including possibly contaminated (with petroleum products);
- construction waste;
- electrode stubs;
- scrap of ferrous metals;
- cleaning rags;
- worn-out special clothing;
- food waste;
- solid household waste.
- смет.

Calculations have shown that during the construction of the facility, waste is generated in the amount of 9 items in the amount of 22684.72 tons/year.

The temporarily generated waste includes:

- waste of the soil and vegetation layer - 22,500 tons/year (hazard class 5); construction waste – 2.5 tons/year (hazard class 4);
- ferrous metal scrap – 5.5 tons/year (hazard class 5);
- electrode stubs – 0.45 t/year (hazard class 5);
- cleaning rags – 1.95 tons/year (4 hazard classes);
- worn workwear - 1,267 tons/year (4 hazard classes);
- food waste – 3.0 tons/year (hazard class 5);
- Solid waste – 32.5 tons/year (hazard class 5);

- The estimate - 139.5 tons/year (4 hazard classes).

9.4.2 Operational stage

According to the draft Environmental Management System, a total of 21 types of waste are expected to be generated during the operation of the enterprise's facilities, in the amount of 127.0 tons per year, of which:

- 18.221 tons/year, hazard class 2 (6 types of waste);
- 0.307 t/year, class 3 (1 type);
- 94.416 tons/year, class 4 (8 types);
- 13.375 tons/year, class 5 (6 types).

The list of waste generated during the operation of a combined cycle power plant is given in Table 9.4.1

Table 9.4.1 List of waste generated

Item	Name of the waste	Approximate quantity of generated waste, tons/year	Hazard class
1	Sludge from acid washing of boilers	6,0	4
2	Spent fuel (transformer oil, as well as petroleum products caught by means of oil traps)	0.56	2
3	Used fuel and lubricants (engine oils)	0.19	2
4	Used fuel and lubricants (compressor oils)	4.75	2
5	Used fuel and lubricants (turbine oil)	12,68	2
6	Scrap of ferrous metals	8.8	5
7	Non-ferrous metal scrap	0.55	5
8	Scrap lead (pieces)	0,007	2
9	Welding electrode stubs	0.5	5
10	Used batteries, not disassembled with electrolyte not drained	0,034	2
11	Used tires	0.307	3
12	Wiping material contaminated with oils, less than 15%	0.017	4
13	Worn-out workwear	0.136	4
14	Used LED panels	0.081	4
15	Waste paper waste	0.025	5
16	Waste from the medical center	0,007	4
17	Waste metal barrels	0.420	5
18	Waste plastic container	2.625	4
19	Food waste	0.3	4
20	Solid household waste	3,5	5
21	Departure from cleaning the territory	85.25	4
	Total	**127**	

9.4.3 Recommendations

9.4.3.1 Measures to prevent and mitigate impacts

Construction stage

Organizational and technical measures to prevent and mitigate negative impacts are proposed at the construction stage (Table 9.4.2).

Operational stage

At the operational stage, the hierarchy of measures for waste management includes the following decisions:

- prevention of waste generation;
- reducing the volume of education;
- reuse;
- regeneration;
- recycling;
- removal and final destruction.

Measures to mitigate (minimize) the impact of waste also include:

- arrangement of production and consumption waste storage sites;

9.4.3.2 Monitoring and reporting

Measures and monitoring of waste management processes are presented in Table 9.4.2.

9.4.4 Assessment results

The matrix of the results of the assessment of the impact of power plant activities related to waste generation is presented in Table 9.4.3.

It is established that the impact of the planned activity on the environment related to waste management is estimated as follows:

- at the construction stage – negligible;
- at the operation stage – low.

Sources

1. The Law of the Republic of Uzbekistan “On Nature protection” No. 754-XII dated on 09/12/1992.
2. The Law of the Republic of Uzbekistan “On waste” No. 362-II dated on April 5, 2002.
3. General Environment, Health and Safety Guidelines (EHS). IFC, 2007
4. IFC. Environmental, Health and Safety Guidelines for Waste Management Companies. IFC, 2007
5. Resolution of the Cabinet of Ministers of Uzbekistan No.78 dated on 14/02/2017.

Table 9.4.2 Measures to prevent and mitigate impacts related to waste management

No	Activity/ process	Tasks	Measures	Applicable requirements	Monitoring	Way of implementation/reporting
I.	**Construction stage**					
1.	Construction works (construction site; construction site)	• Prevention of disordered waste storage • prevention of secondary contamination of soils, surface and groundwater • protection of soils, surface and underground waters from leaks and/or spillage of liquid waste	• Organization of specially equipped sites for safe temporary storage (accumulation) of waste, arrangement of waterproof coating on the sites of storage of construction and municipal solid waste • ensuring waste accumulation limits; • regular removal of construction and other waste by authorized contractors; • separate collection of hazardous waste; • storage of waste of hazard class 2-3 (oiled rags, paints and varnishes, oils and lubricants, etc.) using a secondary protective shell (pallets), preventing leakage; • storage of municipal solid waste and food waste in containers with lids and in storage areas equipped with a canopy or roof to prevent them from getting wet • equipment of a special maneuvering area for temporary storage of excess soil with a hard waterproof covering • collection, disposal and treatment of all types of wastewater, including stormwater and meltwater (for example, according to temporary scheme) • equipping with consumables and equipment for the prompt elimination of the consequences of spills or leaks	IFC EHS IFC. Guidelines for waste management enterprises on EHS protection IFC PS-1 IFC PS-3 Federal Law “On waste” Sanitary rules of the Republic of Uzbekistan dated on 04.11.1996 No. 0068-96 Sanitary rules of the Republic of Uzbekistan No. 0127-02 dated on 29/07/2002	• Regular visual checks of all platforms, storage devices and containers for the collection and temporary storage of waste: – the correct labeling of the storages and containers; – inspection of storage containers to detect leaks, leaks or other signs of loss – detection of cracks, corrosion or damage to storage devices and containers – checking the condition of the site coverage – documentation of status check results – recording of any changes to platforms and/or storage devices, as well as significant changes in the amount of waste stored must be fixed • Regular activity check of waste sorting and collection • Waste classification и periodic documentation of their properties, and also the correct treatment with waste, primarily with hazardous ones • Documenting information about the location of all hazardous waste on the site, as well as data on their quantity in each of these places.	Development and implementation of management plans in the field of occupational safety and the environment (pollution prevention and control plan during the construction phase, Waste Management Plan)

	Activity/process	Tasks	Measures	Applicable requirements	Monitoring	Implementation method/reporting
II.	**Operating stage**					
2.1.	Main production activity (electricity generation) Provision of basic production activities – repair work, water supply, sanitation, water supply, cleaning of the territory and industrial premises Transport and logistics (delivery of materials and raw materials, fuels and lubricants, shipment of products, other transportation, storage of hazardous materials)	• Prevention of the negative impact of waste on the health of the population and staff • prevention of disordered waste storage • prevention of secondary contamination of soils, surface and groundwater • protection of soils, surface and underground waters from leaks and/or spillage of liquid waste	• Minimization of waste generation; • creation and implementation of a system for selecting consumers of secondary resources; • creation and implementation of the system for selecting contractors for waste management; • ensuring waste accumulation limits; • regular waste disposal by authorized contractors • separate collection of hazardous waste • storage of waste of 2-3 hazard classes with the use of a secondary protective shell (pallet) that prevents leakage • storage of municipal solid waste and food waste in containers with lids and in storage areas equipped with a canopy or roof to prevent them from getting wet	IFC EHS IFC. EHS Safety Guidelines for Metallurgical Plants of the IFC. Guidelines for waste management enterprises on EHS protection IFC PS-1 IFC PS-3 Federal Law "On waste" Sanitary rules of the Republic of Uzbekistan dated on 04.11.1996 No. 0068-96 Sanitary rules of the Republic of Uzbekistan No. 0127-02 dated on 29/07/2002	• Regular visual checks of all sites, storage facilities and containers for the collection and temporary storage of waste: – the correct labeling of the storages and containers; – inspection of containers for storing to detect leaks, leaks or other signs of loss – detection of cracks, corrosion or damage to the storages and containers – checking the condition of the site coverage – documenting the results of condition checks – recording of any site changes and/or storage containers, as well as significant changes in the number of stored waste • Regular activity check of waste sorting and collection • Periodic analysis of waste generation trends by type and quantity, taking into account the process of their forming on separate divisions of the facility • Classification of waste and periodic documentation of their properties, as well as proper waste management, primarily hazardous • Monitoring of groundwater quality (see Section 9.7) • Recorded data on monitoring of collection, storing and transportation of dangerous waste processes must include the following information: – name and identification number of the waste; – physical condition; – quantity; – transport documentation • Documenting information about the location of all dangerous waste on the territory of the facility, as well as data on their number in each of these places	• reports based on the results of all types of monitoring • keep records of waste accounting • statistical reporting • a documented selection procedure and inspections of contractors carrying out the appeal with the waste of the enterprise

Table 9.4.3 Waste Generation Impact Assessment Results Matrix

Life cycle: construction

Recipients: soil-forming rocks, surface and groundwater (groundwater)

Recipient sensitivity: low, medium

Characteristics of impacts

Impact	Contamination of soil-forming rocks, surface and underground (ground) waters		**Orientation**	**Genesis**	**Mechanism**
			Negative	Direct	–
Primary impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Short-term	Reversible	Minor	Low
Consequences	Indirect impacts on personnel, population, flora and fauna				
Measures	• Organization of specially equipped sites for safe temporary storage (accumulation) of waste, arrangement of waterproof coating on the sites of storage of construction and municipal solid waste • ensuring waste accumulation limits • regular removal of construction and other waste by authorized contractors • separate collection of hazardous waste • storage of waste of 2-3 hazard classes (oiled rags, paints and varnishes, oils and lubricants, etc.) using a secondary protective shell (pallets) that prevents leaks • storage of municipal solid waste and food waste in containers with lids and in storage areas equipped with a canopy or roof to prevent them from getting wet • equipment of a special shunting platform for temporary storage of excess soil with a hard waterproof coating • collection, disposal and treatment of all types of wastewater, including stormwater and meltwater (for example, according to temporary scheme) • equipping with consumables and equipment for the prompt elimination of the consequences of spills or leaks				
Residual impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Short-term	Reversible	Minor	Negligible

Life cycle stages: operation

Recipients: soil-forming rocks, surface and underground (groundwater) waters, atmospheric air

Recipient sensitivity: low, medium, high

Characteristics of impacts

Impact	Contamination of soil-forming rocks, surface and underground (ground) waters		**Orientation**	**Genesis**	**Mechanism**
			Negative	Indirect	–
Primary impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Long-term	Reversible	Medium	Moderate
Consequences	Indirect impacts on personnel, population, flora and fauna				
Measures	• Minimization of waste generation • creation and implementation of the system for selecting contractors for waste management • ensuring waste accumulation limits • regular removal of construction and other waste by authorized contractors • separate collection of hazardous waste • storage of waste of 2-3 hazard classes with the use of a secondary protective shell (pallet) that prevents leakage • storage of municipal solid waste and food waste in containers with lids and in storage areas equipped with a canopy or roof to prevent them from getting wet				
Residual impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Long-term	Reversible	Small	Low

9.5 Impact on surface waters

9.5.1 Assessment methodology

The assessment of the impact of the proposed activity on surface water bodies was carried out taking into account national requirements and IFC requirements in the field of protection and use of surface waters.

The nearest surface watercourse to the designated site for the construction of the power plant is an irrigation canal, which flows at a distance of 11.5 meters in an easterly direction with a capacity of 20 to 25 cubic meters of water per second and a total depth of 4 meters along the edge of the normal water level.

The main irrigation canal flows at a distance of 880 meters in the south-west direction with a throughput of 40 to 50 cubic meters of water per second and a total depth of 6 meters along the edge of the normal water level

The main irrigation canal originates from the Jizzakh reservoir, then flows next to the city of Jizzakh in the direction of the agricultural fields of the village of Yangikishlok and other settlements.

The coastal zone of the Jizzakh reservoir is located in the south direction from the project area at a distance of 1.7 km.

The criteria and requirements presented in the following documents were used for the assessment:

- IFC guidance documents:
  - General Environment, Health and Safety Guidelines (EHS);
  - Environmental, Health and Labor Safety for thermal power plants.
  - Environmental, Health and Safety Guidelines for Water Supply and Sanitation Systems.
- Regulatory and technical documents of the Republic of Uzbekistan:
  - O'z DSt 951:2011 "Sources of centralized domestic and drinking water supply. Hygienic, technical requirements and selection rules";
  - SanR&N RUz No. 0318-15 "Hygienic and anti-epidemic requirements for the protection of water bodies in the territory of the Republic of Uzbekistan";
  - Construction standards KMK 2.04.01-98 "Internal water supply and sewerage of buildings";
  - Construction standards KMK 2.04.03-97 "Sewerage. Outdoor networks and facilities";
  - Regulation on the procedure for approving water protection zones and sanitary protection zones of water bodies in the Republic of Uzbekistan (approved by Resolution of the Cabinet of Ministers dated 11.12.2019 No. 981);
  - Regulations on the procedure for the development and harmonization of environmental standards (approved by the Resolution of the Cabinet of Ministers No. 14 dated on 14/01/2014).

According to the IFC EHS, the concentration of pollutants due to the discharge into reservoirs of wastewater generated as a result of the production process and auxiliary operations, as well as as a result of the discharge of economically-

domestic and stormwater effluents should not exceed the criteria for the quality of natural waters established by the requirements of regulators [8].

When wastewater is discharged into water bodies according to [8], it is also necessary to ensure:

- wastewater treatment standards corresponding to the industry Guidelines applicable to this project [9];
- standards established at the national or local level for household wastewater, and in the absence of such, indicative recommendation standards for household wastewater presented in [8];
- the temperature of wastewater before discharge, which should not increase the water temperature of the water body at the boundary of the mixing zone by more than 3 °C.

Natural and wastewater quality criteria were used to analyze and forecast the condition of surface water bodies:

  - indicators presented in the “Handbook of an Environmental expert” (Publication of the State Committee of the Republic of Uzbekistan for Nature Protection and State Environmental Expertise, Tashkent, 2009[29]; p. 141);
  - the evaluation criteria presented in the industry [9] (permissible concentrations in effluents at discharge into a water body, which are provided without dilution and are observed for at least 95% of the operating time of the enterprise).

The fisheries quality standards for water bodies presented in the “Handbook of an Environmental Expert” [10] correspond to the quality standards – MPC of the VNIRO handbook (1999) and previously applied in the Russian Federation [1].

The possibility of using this list and MPC in UZBEKISTAN to assess the water quality of fishery reservoirs according to 1204 indicators [1] is confirmed by the letter of the State Committee for Ecology dated 01/26/2022 No. 03- 02/3-250

A comparison of national and international wastewater requirements for discharge into water bodies is presented in (Table 9.5.1). The table shows the quality criteria for pollutants and wastewater properties that are specific to the production and stormwater runoff of the enterprise (see Section 9.5.2).

Table 9.5.1 National and international requirements for wastewater from metallurgical plants when discharged into water bodies

Item	Pollutants and indicators of wastewater properties [1]	Indicators according to national requirements	Acceptable values in effluents according to the industry Guidelines of the EHS [9]	Target
1.	Temperature, ^{0}C	Requirements are not set	Temperature rise in a water body no more than 3 ^{0} C [3]	Temperature increase in a water body by no more than 3 ^{0} C [3]
2.	pH	6.5-8.5	6,0-9,0	6.5-8.5
3.	Dissolved oxygen, mg/^{dm3}	4 or more	Requirements are not set	4 or more
4.	Phosphates, mg/dm^3	0.2	2.0	
5.	Sulphates, mg/dm^3	100	Requirements are not set	
6.	Chlorides, mg/dm^3	300	Requirements are not set	
7.	Ammonium nitrogen, mg/dm^3	0.4	5.0	0.4
8.	Nitrogen of nitrates, mg/^{dm3}	9.3	The amount of nitrogen of nitrates and nitrites is 25 mg/dm330	
9.	Nitrite nitrogen, mg/^{dm3}	0.03		
10.	Iron, mg/dm^3	0.1	5.0	0.1
11.	Chromium, mg/dm^3	0.07	0.1	0.07
12.	Manganese, mg/dm^3	0.01	Requirements are not set	0.01
13.	Calcium, mg/dm^3	180	Requirements are not set	180
14.	Magnesium, mg/dm^3	40	Requirements are not set	40
15.	Suspended solids, mg/dm ^{3}	requirements are not set	35	35
16.	Cyanides, mg/^{dm3}	0.05	0.5	0.05
17.	Fluorides, mg/dm ^{3}	0.32	5	0.32
18.	Total content of petroleum hydrocarbons (petroleum products), mg/^{dm3}	0.05	10	0.05
19.	Phenol, mg/dm ^{3}	0.001	Requirements are not set	0.001
20.	Total salt content, mg/dm^3	1000	Requirements are not set	1000
21.	Copper, mg/dm^3	0.001	0.5	0.001

Based on the requirement [8] to ensure locally established criteria for the quality of natural water during wastewater discharge, indicative indicators for fisheries reservoirs in accordance with the national requirements of Uzbekistan, which are more stringent than the requirements established by the IFC in [9] for all indicators, were adopted as targets for the discharge of wastewater from the enterprise into water bodies wastewater, except suspended solids and temperature.

For the temperature and concentration of suspended solids, the target indicator has been adopted at the level set by the industry Guidance on EHS (Table 9.5.1).

Thus, taking into account the explanation of the national regulator for the assessment of water quality in water bodies planned for the discharge of wastewater of the enterprise, the fisheries quality standards (MPC) contained in the list of VNIRO 1999 were adopted.

Due to the lack of acceptable values in the list of MPC and in the industry Manual [9], an indicative quality indicator for fisheries water bodies, presented in the “Handbook of an Ecologist expert” [10], is proposed as a target indicator for mineralization.

9.5.2 Analysis of the design scheme for water supply and sewerage of the ENTERPRISE

The drainage channel of the Jizzakh reservoir is considered as a source of household water supply for the enterprise.

According to the technology, in order to avoid the formation of salt deposits on the walls of the equipment, the cooling towers are constantly purged. Purge waters are conditionally pure. The total salt content in this water does not exceed the salt content in the source water. It is planned to monitor the salinity in the source and purge waters. The purge water of the cooling tower and the water after cooling of the equipment are diverted to the internal sewer network of the enterprise and then it is planned to be sent to the irrigation canal next to the industrial site.

The main characteristics of water consumption and wastewater disposal of the enterprise are adopted on the basis of the initial information provided by the Customer on the object of the planned activity.

It should be noted that when using the innovative “Dry Flexicycle” technology in the steam cycle of a dry condenser connected to the radiator cooling circuit, the total water consumption of the power plant drops to such a low level that it can be used in the most arid and arid regions. “Dry Flexicycle” is the optimal solution for power plants operating on a flexible base load (both with gas and multi-fuel configurations).

According to the data provided by the Customer, the production water consumption is formed conditionally based on the calculation of electricity generation per 1 MW of about 0.36 m3 of water.

The approximate water consumption is calculated taking into account the water consumption per 1 MW - about 0.36 m3 (water intake for the chemical water treatment system, recharge of the raw water tank, fire system and others).

With the production capacity of the power plant - 550 MW/h, the hourly water consumption will be: 550.0 x 0.36 = 200.0 m3/hour, 4800 m3/day.

The power plant will use a circulating water supply system with the installation of a fan-mounted cooling tower of the “CENK” type (3 fans in each tower). The cooling range of the cooling towers will be 10 C, the inlet water temperature is 34 C, the outlet water temperature is 24 C, the drip loss is 0.20% and the evaporation of water will be 1.30%.

After filling the system with a technological volume of water, then there is a periodic replenishment of water losses in the technological cycle. Replenishment of losses in the circulation system (evaporation and entrainment of water in cooling towers, purging of the circulation system) is provided by supplying additional water from the raw water tank.

The cooling water from the cooling tower will be used mainly in the condenser to condense the exhaust steam. The oil block also uses cooling water to cool the lubricating oil.

In general, the design solutions for the water supply and sanitation of the planned production (including the operation of the enterprise’s water circulation cycles) comply with the requirements of the EU BAT.

The volumes of wastewater disposal of the enterprise are presented in the table (Table 9.5.6).

Table 9.5.6 Main characteristics of the company’s wastewater disposal

Item	Name of the drains	The amount of lead		Drainage conditions
		m3/day.	thous. m3/year	
1.	Household waste water	17.993	6277.67	They will be discharged into waterproofing cesspools with a volume of 90 m3 each, followed by export to the nearest treatment facilities on the basis of an economic agreement with specialized enterprises
2.	Conditionally clean effluents from cooling tower purging, equipment cooling	1.634	572.124	They will be sent to the irrigation canal.
TOTAL		**19.627**	**6849.794**	

Measures to prevent or mitigate negative impacts are presented in Section 9.5.6.

9.5.3 Construction stage

During construction work, water is used to prepare mortar, irrigate the territory in order to reduce dusting, as well as for the household needs of builders. Water supply during construction works will be carried out at the expense of borehole and imported water supply. Imported water tanks will be filled from the sources of the district water supply network.

Imported bottled water, purchased independently by a construction contractor, is partially used for the drinking needs of builders.

During the construction of the power plant, about 650 builders and employees (50 people including ETP) will work on the territory of the construction site.

The construction period is 36 months, about 950 days per year.

During the construction of a combined–cycle power plant, the water consumption rate per day is determined according to KMK 2.04.01.98 g, where it is 25 liters per worker and 12 liters for ETP.

The total water consumption during the construction of the power plant will be 79.80 m3/day. or 44133.0 m3/year, of which:

- for production needs - 20.56 m3/day. or 2540.0 m3/year;
- for household and drinking needs - 59.24 m3/day. or 41593.0 m3/year.

Industrial effluents are not formed during construction. The water used for the preparation of mortar, irrigation of the territory in order to reduce dusting is irretrievably lost.

Household wastewater generated during construction is planned to be sent to a temporarily installed storage tank (sewage tank) with subsequent export to the nearest treatment facilities.

The total wastewater disposal (effluents) of household effluents during the construction of a combined-cycle power plant will amount to 59.24 m3/day. or 41593.0 m3/year (excluding water consumption for production needs (irrevocable) and irrigation of the territory).

9.5.4 Operational stage

The water supply of the planned power plant during operation consists of production and household and drinking needs.

The power plant’s water supply sources are:

- drainage channel of the Jizzakh reservoir - for industrial water supply;
- centralized district water supply for household and drinking needs.

Water consumption for the production needs of a power plant consists of water consumption:

- to recharge the steam-water cycle and the circulating cooling system;
- to purge cooling towers;
- on the need for additional water of the ChWT system.

A closed, circulating cooling system is used to cool the CCGT equipment. A mixture of demineralized water and ethylene glycol is used as a cooling medium in a closed circuit.

The heated water of a closed circuit is cooled by water from an auxiliary (external) circuit, which includes wet fan cooling towers with an internal pool, pumping stations, an inhibitor dosing system and monitoring devices. The water bowl of the cooling tower is filled with clarified water supplied by pumps from the tanks of the industrial water supply.

The additional water consumption consists of the losses of the settling tanks, the circulating cooling system (evaporation and entrainment of drip liquid in cooling towers), the water consumption for purging cooling towers, as well as the intake of additional water into the ChWT system.

The primary purified water is sent to the raw water reservoir, from where the water flow is further distributed to the needs of the cooling tower, to recharge the cooling tower, to demineralize and cool the systems.

The circulating water cooled at the cooling towers is supplied via circulation pumps to the condensers of the steam turbine and to all auxiliary equipment through circulation ducts. After condensers and other heat exchangers, the spent (heated) water is sent to cooling towers for cooling by circulating water ducts.

Replenishment of losses in the circulation system (evaporation and entrainment of water in cooling towers, purging of the circulation system) is provided by supplying additional water from the raw water reservoir.

In order to avoid the formation of salt deposits on the walls of the equipment, constant purging of cooling towers is provided. Purge waters are conditionally pure. The water after purging, being conditionally clean, is planned to be discharged through the water pipes into the irrigation canal.

For production purposes, during the operation of the 550 MW power plant, water will be used for the water cooling system of the equipment, for the water treatment system to compensate for the losses of steam and condensate in the GPU cycle.

According to the data provided by the Customer, the production water consumption is formed conditionally based on the calculation of electricity generation per 1 MW of about 0.36 m3 of water.

The approximate water consumption is calculated taking into account the water consumption per 1 MW - about 0.36 m3 (water intake for the chemical water treatment system, recharge of the raw water tank, fire system and others).

With the production capacity of the power plant - 550 MW/h, the hourly water consumption will be: 550.0 x 0.36 = 200.0 m3/hour, 4800 m3/day.

Then, further water intake for the needs of chemical water purification (primary sand filter, demineralization site, chemical preparation site, primary and secondary reverse osmosis and others) for production purposes will amount to (4800 x 350) 1680000.0 m3/year or 1680.0 thousand m3/year.

Calculations of industrial water consumption after chemical water treatment:

- for the needs of cooling, recharge of the steam–water cycle of the cooling tower - 80.5 m3/ hour, 1,932 thousand m3 / day. or 676,200 thousand m3/year;
- for the needs of a gas turbine (recharge, purge, flushing, cooling); – 35.5 m3/hour, 0.852 thousand m3/day. or 298.2 thousand m3/year;
- to recharge technologies with process water – 40.0 m3/hour, 0.960 thousand m3 /day. or 336.0 thousand m3/year;

- other consumption for production needs (water treatment, preparation of solutions, etc.) – 44.0 m3/hour, 1.056 thousand m3/day or 369.6 thousand m3/year.

Then, the total water consumption for the production needs of the power plant will amount to 200.0 m3/hour, 4,800 thousand m3/day. or 1680,0 thousand m3/year.

Calculation of water consumption for household drinking and irrigation needs.

Water for household and drinking needs for the 550 MW power plant will be supplied from the district water supply system. A water meter will be installed to record the actual water consumption.

Household and drinking needs consist of water consumption for the drinking needs of the working staff, water consumption for showers for the working staff, the needs of the dining room for cooking, wet cleaning of premises, watering the territory.

The estimated water consumption for household and drinking needs was adopted in accordance with the requirements of KMK 2.04.01-98 “Internal water supply and sewerage of buildings”.

Irrigation of green spaces is planned on the territory of the industrial site of the new power plant in the area of the projected administrative and household building and fan cooling towers.

The estimated water consumption for watering green spaces was adopted in accordance with the requirements of KMK 2.04.01-98 “Internal water supply and sewerage of buildings”.

Water consumption for drinking needs.

Water consumption for the household and drinking needs of the company’s personnel is calculated according to the formula:

W = N x r x T / 1000, m3/year, where

N is the standard of water consumption per person per shift, N = 25 liters; d is the number of employees.

T is the planned number of working days.

The water consumption for the drinking needs of workers during the operation of the enterprise will be:

Q1 = 25 x 65 x 350 x 10-3 = 568.75 m3/year or 1,625 m3/day,

where 25 liters /day is the water consumption rate per worker, 65 is the number of workers per shift, 350 days is the working time per year.

The consumption of water for drinking water needs during the operation of the enterprise will be: Q2 = 12 x 5 x 350 x 10-3 = 21.0 m3/year or 0.06 m3/day,

where 12 liters / day is the rate of water consumption per ETP, 5 is the number of ETP per

at the enterprise, 350 days is the working time per year.

Then, total: 1,685 m3/day. or 589.75 m3/year.

Water consumption for plumbing work.

We determine the amount of water for household needs.

Vh= [(n× k×h)×d]/1000 (m3/year)

where:

Vh – The amount of water consumed for household needs n – the rate of water consumption per 1 person, 1 shower net, l/hour

k – Number of toilet glasses, urinals, showers and sinks, pcs. h – operating time of bathrooms, hour/day

d is the number of working days per year.

The number of sinks in the enterprise is 30 pcs , toilets - 25 pcs.

The calculation of water consumption for plumbing needs is performed according to the formula: W = N x n x k / 1000, m3/year, where

N - the standard of water consumption per 1 unit; n - the number of sources;

k - the operating time of the source;

Water consumption for plumbing (toilets, sinks).

Toilets (toilets with cisterns) – 25 units. (sewage system). The norm is 83 liters/hour per 1 unit (item 16 from the table in Appendix 2 of KMK 2.04.01-98, p. 151). They work 4 hours a day, 350 days a year.

For toilets with Vh tanks = 83 × 25 × 4 /1000 = 8,3 m3/day × 350 = 2905.0 m3/year.

Sinks – There are 30 units of sinks on the territory, they work 4 hours a day, 350 days a year. The norm is 30.0 liters/hour (item 1 from the table in Appendix 2 of KMK 2.04.01-98, p. 150).

Vh= 30 × 30 × 4 /1000 = 3,6 m3/day × 350 = 1260,0 m3/year.

Wet cleaning of premises (floor cleaning).

The area of the premises subject to wet cleaning is, according to buildings and premises where wet cleaning is necessary, 3000.0 m2 and the dining room – 340.0 m2.

The water consumption for cleaning the premises is calculated using the formula: Water consumption is calculated using the formula:

W = N x S x k x T /1000, where

N - the standard of water per 1 m2 of the territory to be cleaned, N =2 liters. S - the area of the territory to be cleaned;

k – the planned number of cleanings per day;

T the planned number of harvest days per year, T = 350 days. Wet cleaning of premises:

W = 2 x 3000.0 x 1 x 350 / 1000 = 2100.0 m3/year or 6.0 m3/day. Wet cleaning of the dining room:

W = 2 x 340.0 x 1 x 350 / 1000 = 238.2 m3/year or 0.68 m3/day. The total consumption for wet cleaning is 2338.2 m3/year or 6.68 m3/day.

60% of the water used in wet cleaning enters the cesspool, 40% of the water is irretrievable losses.

Consequently, the discharge of water (effluents) into the cesspool will be: 1402.92 m3/year or 4,008 m3/day.

Water consumption for the needs of the dining room.

The calculation of water consumption for cooking is made according to the formula:

W = N x k /1000, m3/year, where

N - the consumption standard for one conventional dish, N = 12 liters;

k - the number of dishes, k = (about 30 people eat per day. or about 10,000 meals per year);

W = 12 x 10000 / 1000 = 120.0 m3/year or 0.4 m3/day.

The norm of water disposal is equal to the norm of water consumption.

Watering of green spaces.

Water consumption is calculated using the formula:

W = N x S x to T /1000, where

N - the standard of one watering per square meter of plantings, N = 6 liters. S - the area of green spaces, S= 25000 m2;

k - the planned number of waterings per day, k = 1;

T - the planned number of watering operations per day, k = 1; T - the planned number of watering days, T = 90 days.

W = 6 x 25000 x 90 / 1000 = 13500.0 m3/year or 150.0 m3/day.

Water consumption for watering green spaces refers to irretrievable losses.

There is no waste water discharge.

Watering the territory.

Water consumption is calculated using the formula:

W = N x S x to T /1000, where

N - the standard of one watering per square meter of the territory, N= 0.4 liters. S - the area of the territory for irrigation, S= 10000 m2;

k - the planned number of waterings per day, k = 1;

T - the planned number of watering operations per day, k = 1; T - the planned number of watering days, T = 90 days.

W = 0.4 x 10000 x 90 / 1000 = 360.0 m3/year or 4.0 m3/day.

Water consumption for watering green spaces refers to irretrievable losses.

There is no waste water discharge.

The total water consumption (water consumption) for household, drinking and irrigation needs of the power plant is 174.665 m3/day. or 21072.95 m3/year.

Water disposal.

Justification of water losses and compliance with the formation of industrial effluents.

The consumption of additional water consists of losses in the circulation system and selection for HVAC. Determination of cooling water losses in the circulation system:

Losses in the cooling tower.

Evaporation losses. The calculated evaporation losses are determined for the summer regime (VII) by the maximum average monthly daily air temperature t air = 35.7°C.

Q ev. = Q ev. x ∆t x q w/f (KMK 2.04.02-97, p. 97)

where: K ev - the coefficient of evaporation at an air temperature of 35.7°C; K ev.= 0.001565.

∆t - the temperature difference between incoming and cooled water, we preliminarily determine ∆t=8oC

q w/f - the circulating water flow rate, q w/f = 4500.5 m3/h. q w/f = 0.001565 x 8 x 4500.5 = 56.346 m3/h.

Wind ablation losses from the cooling tower.

We accept according to the characteristics of modern drop traps – 0.003% of the circulating water flow rate

Q w/ab. = 0.003% of q w/f.

Q w/ab. = 4500.5 m3 x 0.003%/100% = 0.135 m3/h.

Total losses in the cooling tower will be: q c/t = q ev. + q w/ab. = 56.346 + 0.135 = 56.481 m3/h.

Losses during evaporation and various losses from wastewater settling tanks, from the pumping, transportation and storage system of water will average 0.103 m3/h.

Total losses in the circulation system will be:

Q cir.s.loss = 56,481 + 0,135 + 14,671 + 0,103 = 71,390 m3/h.

Taking into account water consumption for production needs in the total volume of 200.0 m3/hour, 4.800 thousand m3/day or 1680.0 thousand m3/year and deducting losses in the circulation system in the volume of 71.390 m3/hour, 1.713 thousand m3/day or 599.55 thousand m3/year, as well as the use of the “ZLD” water circulation system and water savings in the volume of 60.5 m3/hour, 1.452 thousand m3/day or 508.2 thousand m3/year the total water disposal (conditionally clean production wastewater) will be: 68.11 m3/hour, 1.634 thousand m3/day or 572.124 thousand m3/year. Then, conditionally clean industrial wastewater from the power plant will amount to 1,634 thousand m3/day or 572,124 thousand m3/year, which will be directed to the irrigation canal.

9.5.5 Recommendations

9.5.6.1 Measures to prevent and mitigate impacts

Measures to prevent and mitigate impacts are presented in Table 9.5.10.

9.5.6.2 Monitoring and reporting

It is recommended to carry out water quality control at the stages of construction and operation of the enterprise:

- Irrigation canal – in the initial and final gates on the canal section in the area of water discharge in accordance with environmental standards of maximum permissible discharge;

9.5.6 Assessment results

Matrix of the impact assessment results (Characteristics of impacts) on groundwater is given in Table 9.5.11.

It is established that the impact of the proposed activity on surface waters is estimated as follows:

Irrigation canal:

- at the construction stage – no significant impact is predicted;
- at the operation stage – low.

Sources

1. The list of fishery standards: maximum permissible concentrations (MPC) and approximately safe levels of exposure to harmful substances for water of water facilities of fishery importance / VNIRO Publishing House – Moscow, 1999
2. The European Commission. The JRC 2013 Reference Report is a reference document on the best available technologies (BAT) for the production of cast iron and steel.
3. Industrial Emissions Directive 2010/75/EC (integrated pollution prevention and control).
4. IFC's General Guidance on Environmental, Health and Labor Protection http://www.ifc.org/wps/wcm/connect/be37221a-fc47-4379-b539- https://www.ifc.org/wps/wcm/connect/be37221a-fc47-4379-b539 - eca3fe72c3e6/General%2BEHS%2B-%2BRussian%2B- %2BFinal_.pdf?MOD=AJPERES&CVID=jqeI79F
5. IFC Guidelines on Environmental, Health and Labor Protection for Metallurgical plants https://www.ifc.org/wps/wcm/connect/941b0a8c-64a2-49a7-ba1c - 16a2026635ac/Integrated%2BSteel%2BMills%2B- %2BRussian%2B- %2BFinal.pdf?MOD=AJPERES&CVID=jkD2Bji
6. Handbook of an environmental expert. State Committee for Ecology of the Republic of Uzbekistan, 2009

Table 9.5.11 Measures to prevent and mitigate impacts on surface waters

Item	Activity/ process	Task	Measures	Applicable requirements	Monitoring	Implementation method/ reporting
I.	**Construction stage**					
1.	Construction works (earthworks, general construction works)	• Prevention of water facilities pollution	• Collection and disposal of all types of wastewater, including stormwater and meltwater from construction sites of facilities to temporary storage facilities with subsequent export to treatment facilities; • the use of only specially equipped places for refueling machines and mechanisms with fuel; • regular monitoring of the technical serviceability of all types of vehicles, machines and mechanisms; • equipping the construction site with consumables and equipment for the prompt elimination of the consequences of spills of fuel and/or other liquids. • equipment of construction workings (pits) with water treatment and drainage systems. Responsible - Construction contractor; • implementation of measures to monitor the waters of the irrigation canal	IFC EHS IFC PS-3 National requirements	• Quality control of the irrigation canal at the sites of the company's releases • inspections at the construction site	• Implementation of environmental protection measures in accordance with design documentation and construction organization project • compliance with the requirements of national legislation in the field of environmental protection • Monitoring program for the construction period • Spill Response Plan • reporting on monitoring results • reporting on inspection results
II.	**Operating stage**					
2.	Provision of the main production activity – water supply, sanitation	• Mitigation of impacts associated with the withdrawal of natural waters for use in the production needs of the enterprise • prevention of water facilities pollution	• prevention of uncontrolled flow of wastewater into the irrigation canal	IFC EHS (water supply and sewerage systems) IFC EHS (metallurgical plants) Environmental standards of permissible discharge of "ENTERPRISES" JSC (for drainage water releases)	• Quality control of water bodies (irrigation canal) at the sites of the company's releases • on-site inspections	• Implementation of environmental protection measures in accordance with design documentation • compliance with the requirements of national legislation in the field of environmental protection • Monitoring program for the operation period • reporting on monitoring results • reporting on inspection results

Table 9.5.12 Matrix of surface water impact assessment results

Life cycle stage: operation

Life cycle stage: operation

Recipient: Dalverzin channel

Recipient sensitivity: average

Characteristics of impacts

Impact	Chemical water pollution		**Orientation**	**Genesis**	**Mechanism**
			Negative	Direct	Cumulative
Primary impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Long-term	Reversible	Medium	Moderate
Consequences	Indirect effects on population health, economic entities				
Activities	• prevention of uncontrolled flow of wastewater into the irrigation canal				
Residual impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Long-term	Reversible	Small	Low

9.6 Impact on soil cover

The characteristics of the soil cover of the area of the planned activity are presented in 125-1105-ESIA-PE- Book 2.

The soils of the allocated area for the construction of combined-cycle power plant with a capacity of 550 MW are characterized by transitional hydromorphic soils, where meadow-gray grassy soils predominate, as well as saline soils.

Some areas of the soil cover of the land allocated for the construction of the power plant are formed on grassy loess and loess loams, they are also distinguished by the greater thickness of the humus horizon and the deeper position of the carbonate horizons.

The soil of the selected area is characterized by a uniform mechanical composition, most often loamy or light loamy, a monotonous grayish color and a uniform humus content.

The results of soil and ground testing (see 125-1105-BIO, Section 1) showed that the content of copper, nickel, lead, zinc, chromium, and cadmium exceeds the MPC established in the RUz for mobile forms of metals.

At the same time, it should be noted that soil quality indicators for mobile forms of metals are focused on the assessment of pollutants that form the risks of translocation effects (first of all, risks in the production of agricultural products used to feed the population).

From this point of view, as well as taking into account the industrial purpose of the construction site, recommendations on the levels of Soil Remediation Circular intervention (2013), there are no restrictions for the project related to soil contamination. Nevertheless, when preparing proposals for monitoring environmental components and action plans, it is advisable to provide for the assessment of the soil condition of recreational facilities located in the area of the planned activity and/or on the border of the SPZ of the power plant.

9.7.1 Construction stage

The impact on the soil cover of the enterprise site is predicted during leveling and planning work on the construction site.

Airborne contamination of soils in areas adjacent to the enterprise is also not predicted due to the incomparable levels of impact of natural factors (natural transfer of suspended matter with wind currents) and levels of impact of sources associated with construction work (ground excavation, earthworks, etc.).

Contamination of soil-forming rocks can only be associated with improper practice of temporary accumulation of waste, storage and handling of fuels and lubricants, spills of fuels and lubricants, use of faulty construction machinery, equipment and vehicles.

9.7.2 Operational stage

The impact on the soil cover of the power plant territory is not predicted due to its future absence (the territory will be concreted).

The only type of impact on the soil cover characteristic of the stage of operation of the enterprise is aerogenic pollution of the territory adjacent to the power plant.

The intensity of this indirect impact is determined by airborne contamination of soils, associated not so much with the operation of the enterprise, but with the influence of other municipal and industrial facilities and transport, and with the influence of natural wind transfer of suspended matter.

Pollution of soil-forming rocks, as at the construction stage, at the operational stage can only be associated with improper practices of temporary accumulation of waste, storage and handling of fuels and lubricants, spills of fuels and lubricants, the use of faulty equipment, machinery and vehicles.

9.7.3 Recommendations

9.7.3.1 Measures to prevent and mitigate impacts

Preventive measures to eliminate contamination of the construction site with waste, solutions to prevent spills of fuels and lubricants, the use of serviceable machinery, equipment and vehicles prevent contamination of soil-forming rocks and related consequences (for example, contamination of surface waters, migration of pollutants along the underground water flow, etc.) both at the construction stage and at the operation stage.

Minimization of the level of aerogenic pollution of the soil cover of the areas adjacent to the industrial site is ensured by the implementation of measures to protect atmospheric air from chemical pollution.

As a result of consideration of the impacts on the soil cover and the associated consequences, the implementation of the following preventive measures is recommended.

- Construction stage:
  - collection, disposal and treatment of all types of wastewater, including stormwater and meltwater (for example, according to a temporary scheme);
  - preparation of a Spill Response Plan (petroleum products) for construction contractors, staff training;
  - preparation of specially equipped places for refueling machines and mechanisms with fuel (if necessary, refueling them at the construction site);
  - monitoring the condition of all types of vehicles, machines and mechanisms;
  - organization of specially equipped sites for safe temporary storage (accumulation) of waste;
  - equipping construction contractors with consumables and equipment for the prompt elimination of the consequences of spills of fuel and lubricants and/or other liquids.
- Operational stage:
  - implementation of a set of measures to protect atmospheric air from chemical pollution;
  - equipment of the enterprise's site with stormwater sewerage;
  - collection, disposal and treatment of all types of wastewater;
  - preparation of spill response plan (oil products), personnel training;
  - organization of specially equipped sites for safe temporary storage (accumulation) of waste;
  - monitoring the condition of all types of vehicles, machinery and equipment;
  - equipping the enterprise's divisions with consumables and equipment for the prompt elimination of the consequences of spills of fuels and lubricants and/or other liquids.

9.7.3.2 Monitoring and reporting

In order to exclude adverse effects associated with the impact on the soil cover, it is recommended to provide:

- monitoring of chemical contamination of the soil cover of TNPC (for example, recreational areas, sports grounds) – only for the stage of operation;
- in case of spills – operational monitoring of the state of substrates;
- inspections at the construction site (only for the construction stage). Proposals for monitoring and reporting are presented in the Table (

Table 9.7.1).

9.7.4 Assessment results

Matrix of the results of the impact assessment (Characteristics of impacts) on the soil cover is given in Table 9.7.2.

It is established that the impact of the planned activity on the soil cover is estimated as follows:

- at the construction stage – negligible;
- at the operation stage – low.

Table 9.7.1 Measures to prevent and mitigate impacts on soil cover

Item	Activity/ process	Task	Measures	Applicable requirements	Monitoring	Implementation method/ reporting
I.	**Construction stage**					
3.	Construction works (earthworks, general construction works)	● Prevention of contamination of soil-forming rocks and related consequences (pollution of underground water, etc.)	● Collection, disposal and treatment of all types of wastewater, including stormwater and meltwater (for example, according to temporary scheme) ● preparation of a Spill Response Plan (petroleum products) for construction contractors, staff training ● preparation of specially equipped places for refueling machines and mechanisms with fuel (if necessary, refueling them at the construction site); ● monitoring the condition of all types of vehicles, machines and mechanisms ● organization of specially equipped sites for safe temporary storage (accumulation) of waste ● equipping construction contractors with consumables and equipment for the prompt elimination of the consequences of spills of fuel and lubricants and/or other liquids	- IFC EHS - IFC PS-3 - SanR&N No. 0183-05 Hygienic requirements for the quality of soil in populated areas in specific natural and climatic conditions of Uzbekistan - SanR&N No. 0191- 05 Maximum permissible concentrations (MPC) and approximate permissible concentrations (OPCs) of exogenous harmful substances in the soil - SanR&N No. 0212-06. Sanitary rules and norms for hygienic assessment of the degree of soil pollution of different types of land use in the specific conditions of Uzbekistan	● Operational control of the condition of substrates (in case of spills) ● inspections at the construction site	● Implementation of environmental management measures in accordance with the project documentation and the construction organization project ● compliance with the requirements of national legislation in the field of environmental protection ● Spill response plan (petroleum products) ● training of construction contractor's personnel and maintaining their awareness ● reporting on inspection results
II.	**Operational stage**					
4.	● Main production activity ● Providing basic production activities – repair work, water supply, water drainage, dewatering, cleaning of the territory and production facilities ● Transport and logistics (delivery of raw and other materials, fuels and lubricants, shipment of products, other transportation, storage of hazardous materials)	● Prevention of contamination of soil-forming rocks and related consequences (pollution of underground water, etc.) ● minimization of aerogenic pollution of the soil cover of the areas adjacent to the enterprise	● Implementation of a set of measures to protect atmospheric air from chemical pollution ● equipment of the enterprise's site with stormwater sewerage ● collection, disposal and treatment of all types of wastewater ● preparation of a Spill response Plan (oil products), staff training ● organization of specially equipped sites for safe temporary storage (accumulation) of waste ● monitoring the condition of all types of vehicles, machinery and equipment ● equipping the enterprise's divisions with consumables and equipment for the prompt elimination of the consequences of spills of fuels and lubricants and/or other liquids	IFC EHS IFC PS-3 - SanR&N No. 0183-05 Hygienic requirements for the quality of soil in populated areas in specific natural and climatic conditions of Uzbekistan - SanR&N No. 0191- 05 Maximum permissible concentrations (MPC) and approximate permissible concentrations (OPCs) of exogenous harmful substances in the soil - SanR&N No. 0212-06. Sanitary rules and norms for hygienic assessment of the degree of soil pollution of different types of land use in the specific conditions of Uzbekistan	● Monitoring of chemical contamination of soil cover of TNPC (for example, recreational areas, sports grounds) ● operational control of the condition of substrates (in case of spills)	● Reports on the results of soil monitoring ● implementation of environmental protection measures in accordance with the design documentation ● compliance with the requirements of national legislation in the field of environmental protection ● Spill response plan (petroleum products) ● staff training and awareness maintenance ● reporting on inspection results

Table 9.7.2 Matrix of the results of the assessment of the impact on the soil cover

Life cycle stage: construction, operation

Recipient: soil-forming rocks

Recipient sensitivity: low

Characteristics of impacts

Impact	Contamination of soil-forming rocks		**Orientation**	**Genesis**	**Mechanism**
			Negative	Direct	–
Primary impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Short-term	Reversible	Minor	Low
Consequences	Underground water pollution				
Measures	• collection, disposal and treatment of all types of wastewater, including stormwater and meltwater (for example, according to temporary scheme) • preparation of a Spill response Plan (oil products), staff training • preparation of specially equipped places for refueling machines and mechanisms with fuel (only for the construction stage) • monitoring the condition of all types of vehicles, machines and mechanisms • organization of specially equipped sites for safe temporary storage (accumulation) of waste • equipping with consumables and equipment for the prompt elimination of the consequences of spills of fuel and lubricants and/or other liquids				
Residual impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Short-term	Reversible	Minor	Negligible

Life cycle stage: exploitation

Recipient: soils

Recipient sensitivity: average

Characteristics of impacts

Impact	Aerogenic pollution of the soil cover of the territory adjacent to the enterprise		**Orientation**	**Genesis**	**Mechanism**
			Negative	Indirect	Cumulative
Primary impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Domestic	Medium-term	Reversible	Small	Moderate
Consequences	Indirect effects on the flora and fauna				
Measures	• A set of measures to protect atmospheric air from chemical pollution				
Residual impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Medium-term	Reversible	Small	Low

9.7 Impact on the flora

In accordance with the requirements of IFC PS-1 and PS-6, as well as the norms of the Laws of the RUz “On Nature Protection”, “On environmental expertise”, the main tasks of botanical research within the framework of the ESIA are defined as follows:

- analyze the initial state of the flora in the area of the proposed activity (based on field surveys and analysis of published and stock data);
- identify critical habitats and vulnerable rare and endemic species that may be potentially negatively impacted;
- assess the impacts on the flora (including on critical habitats and protected plant species);
- give a forecast and assessment of the impacts on the flora of the proposed activity.

During a field survey in May 2024, it was determined that the Project Area contains only converted habitats that, according to the IUCN Habitats Classification Scheme (Version 3.1), belong to type 14 Artificial – Terrestrial (Anthropogenic terrestrial habitats), subtypes 14.1 Arable Land, 14.2 Pastureland and 14.4 Rural Gardens and type 15 Artificial – Aquatic, subtype 15.9 Canals and Drainage Channels, Ditches. There are no natural habitats in the Project area. At the time of the survey, construction work was underway on the site, and vegetation had already been destroyed throughout the western half of the site, and several dirt roads run through the central and eastern parts, along which heavy machinery continuously moves.

As a result of botanical research, it was established that the landscapes and vegetation cover of the Project area were completely transformed as a result of human economic activity, and the territory contains transformed habitats (agricultural irrigated lands, residential buildings, farms, infrastructure) with communities of cultural and weed synanthropic vegetation. There are no natural biotopes in the Project area. The species composition of the plants of the Project area is represented by species widely distributed in the developed plains and foothill regions of Uzbekistan. A significant proportion in the species composition and a high abundance in the vegetation cover of synanthropic, weedy plants, including adventitious ones, is an indicator of the anthropogenic transformation of the ecosystems of the studied territory. The survey showed that there are no vulnerable rare and endemic plant species and critical habitats in the Project area that meet the criteria set out in the Performance Standard 6 of IFC.

9.8.1 Construction stage

At the time of the impact assessment, preparatory planning work was underway on the site allocated for construction, thereby having a direct impact on vegetation.

. In total, 68 plant species from 26 families were identified in the study area, of which 26 are weedy synanthropic species (including 6 adventitious), 5 are cultivated (including both introduced and cultivated local species). Rare species listed in the Red Book of Uzbekistan or the IUCN Red List, as well as quarantine weeds included in the national list of quarantine objects, have not been found.

It is established that the spread of the identified adventitious species is not related to the activities of the Project at the construction stage, all the noted introduced species have been naturalized in Uzbekistan for a long time and are widespread in anthropogenic landscapes in the country.

9.8.2 Operational stage

The commissioning of the enterprise should also not have a significant impact on the flora of the area of the planned activity, since the main risks are controlled by measures to protect atmospheric air and other components of the natural environment, provided in

accordance with national legislation and the IFC PS (see. Sections 9.1, 9.4). There are practically no risks associated with the operation of the enterprise for the introduction and spread of adventitious species.

9.8.3 Recommendations

9.8.3.1 Measures to prevent and mitigate impacts

Special measures to prevent and/or mitigate impacts on the flora, compensation in addition to the already provided measures for the protection of atmospheric air and other components of the natural environment, are not required.

9.8.3.2 Monitoring and reporting

It is recommended to conduct a phytopathological examination of the SPZ of the enterprise during the growing season and create stationary sites for geobotanical and phytopathological monitoring in the SPZ of the enterprise;

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9.8.4 Assessment results

There are no critical natural and/or transformed vegetation habitats in the area of the planned activity that meet the criteria set out in the IFC Performance Standard 6.

No threatened plant species listed on the IUCN Red List have been found on the territory.

Despite the fact that transformed biotopes predominate in the territory, natural and anthropogenic plant communities are dominated mainly by local species (not counting plantations of agricultural crops).

It has been established that the main anthropogenic factors negatively affecting the vegetation of the territory under consideration are agriculture, the expansion of settlements, unauthorized landfills, and the spread of adventitious species.

Special measures to prevent and/or mitigate impacts on the flora, compensation in addition to the already provided measures for the protection of atmospheric air and other components of the natural environment, are not required

Matrix of the results of the impact assessment (characteristics of the impact) on the flora is given in Table 9.8.1.

The impact of the proposed activity on vegetation is estimated as negligible at all its stages.

Table 9.8.1 Flora impact assessment results matrix

Life cycle stage: construction

Recipient: plant communities and individual types of vegetation

Recipient sensitivity: negligible

Characteristics of impacts

Impact	Removal of natural habitats		**Orientation**	**Genesis**	**Mechanism**
			Negative	Direct	–
Primary impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Short-term	Reversible	Small	Negligible
Consequences	None				
Measures	Not provided: there are no natural habitats on the site of the enterprise,				
Residual impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Short-term	Reversible	Small	Negligible

Life cycle stage: operation

Recipient: plant communities and individual types of vegetation

Recipient sensitivity: negligible

Characteristics of impacts

Impact	Impacts on habitats associated with aerogenic pollution		**Orientation**	**Genesis**	**Mechanism**
			Negative	Indirect	–
Primary impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Long-term	Reversible	Minor	Negligible
Consequences	None				
Measures	Not provided: there are no natural habitats on the site of the enterprise,				
Residual impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Short-term	Reversible	Small	Negligible

9.8 Impact on terrestrial wildlife

In accordance with the requirements of IFC PS-1 and PS-6, as well as the norms of the Laws of the RUz “On Nature Protection”, “On environmental expertise”, the main tasks of zoological research within the framework of the ESIA are defined as follows:

- to analyze the initial state of terrestrial wildlife in the area of the proposed activity (based on field surveys and analysis of published and stock data);
- identify critical habitats and vulnerable rare and endemic species that may be potentially negatively impacted;
- assess the impacts on terrestrial wildlife (including critical habitats and protected animal species)
- to give a forecast and assessment of the impacts on the fauna of the proposed activity.

As a result of zoological research, it was established that in the area of the planned activity, transformed habitats predominate (irrigated agricultural lands, settlements, industrial enterprises, infrastructure facilities).

The fauna of terrestrial vertebrates has undergone significant changes and is currently represented by a rather meager variety and mainly species capable of coexisting with humans – synanthropic species such as house mouse, gray rat, dwarf bat, myna, magpie, etc.

Birds are represented by a wide variety due to the proximity of the project area to the Jizzakh reservoir, which attracts a large number of birds both during migration and for wintering.

During the survey of the planned area, we selected 7 observation points that most characterize the composition of the local fauna of terrestrial vertebrates. 34 species of terrestrial vertebrates have been recorded in the studied territories, of which 2 species belong to amphibians, 5 species to reptiles, 24 species to birds, 3 species to mammals. Of these, 1 bird species (white stork Ciconia ciconia) is included in the national Red Book

It has been established that the existing impact on the animal world of the territory is associated mainly with population growth, expansion of settlements, and agriculture.

9.9.1 Construction stage

Since the construction site of the power plant is an industrial and agricultural landscape where there are no natural biotopes, direct negative effects on fauna are excluded at the construction stage.

It is also worth noting that there are no natural biotopes, protected animal species and critical habitats in this area.

It has been established that the spread of the identified invasive species (muskrat and gray rat) is not related to activities at the construction stage, all the noted introduced species have long been naturalized in Uzbekistan and are widespread in anthropogenic and natural landscapes.

9.9.2 Operational stage

Since the construction site is an agricultural landscape where there are no natural biotopes, a direct negative impact on the fauna is excluded at the construction stage.

The analysis carried out in accordance with the requirements of clause 16 of IFC PS-6 showed that the habitats of a number of rare animal species (mainly birds) in the area of the planned activity are not classified as critical.

It has been established that the spread of the identified invasive species (muskrat and

gray rat) is not related to activities at the construction stage, all the noted introduced species have long been naturalized in Uzbekistan and are widespread in anthropogenic and natural landscapes.

9.9.3 Recommendations

9.9.3.1 Monitoring and reporting

After completion of construction and commissioning of the combined cycle power plant, it is recommended to conduct studies to monitor the condition of fauna, in particular rare and endangered species, in the Project impact area.

9.9.4 Assessment results

The study of the current state of the fauna of terrestrial vertebrates was carried out directly on the territory of the Project for the construction of a combined cycle power plant with a capacity of 550 MW in the Jizzakh region in accordance with IFC PS-6, in order to obtain data to assess the potential impacts on them and develop measures to mitigate the impact of negative factors on the diversity of animals, including rare species and their habitats.

The site allocated for the construction of combined–cycle power plant is a cultural landscape with various biotopes – agricultural fields, orchards, reservoirs, artificial water structures for irrigation of land with cultivated vegetation, settlements with developed infrastructure.

During the survey of the planned area, we selected 7 observation points that most characterize the composition of the local fauna of terrestrial vertebrates. In the surveyed territories, 32 species of terrestrial vertebrates were recorded, of which 1 species is amphibian, 5 species are reptiles, 23 species are birds, 3 species are mammals.

The fauna of the studied Project area is represented mainly by synanthropic species. Many species of hydrophilic birds have adapted to the conditions of the anthropogenic landscape. Terrestrial vertebrates are important components of modified ecosystems and good indicators reflecting the degree of intensity of anthropogenic impacts and ecosystem transformation. One of the rare and endangered species in the project area is the white stork Ciconia ciconia.

The animals are distributed according to their habitats and biological characteristics in a cultural landscape. The existing circumstances of the Project do not have a negative impact on the fauna in a wide range.

Matrix of the results of the impact assessment (characteristics of the impact) on the flora is given in Table 9.9.2.

It has been established that the significance of the impact of the planned activity on the animal world is assessed as follows:

- at the construction stage – negligible
- at the operation stage – low.

Table 9.9.2 Matrix of the results of the assessment of impacts on terrestrial wildlife

Life cycle stage: construction

Recipient: habitats of terrestrial animals and individual species of terrestrial animals

Recipient sensitivity: medium

Characteristics of impacts

Impact	Habitat removal and related indirect consequences		**Orientation**	**Genesis**	**Mechanism**
			Negative	Direct	–
Primary impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Short-term	Reversible	Small	Low
Consequences	None				
Measures	Not provided: there are no natural habitats on the construction site				
Residual impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Short-term	Reversible	Small	Low

Life cycle stage: operation

Recipient: habitats of terrestrial animals and individual species of terrestrial animals

Recipient sensitivity: medium

Characteristics of impacts

Impact	Habitat removal and related indirect consequences		**Orientation**	**Genesis**	**Mechanism**
			Negative	Direct	–
Primary impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Long-term	Reversible	Small	Low
Consequences	Death and injury of animals				
Activities	Not provided: there are no natural habitats on the construction site				
Residual impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Long-term	Reversible	Small	Low

9.9 Cumulative impacts

Cumulative impacts are impacts generally recognized as significant based on scientific opinion and/or based on the concerns of the affected communities.

Various environmental and social impacts of existing facilities/projects and/or natural, natural-anthropogenic environmental factors in combination with additional effects of the planned activity cause the emergence of cumulative impacts.

Section 3.6 of 122-1105-ESIA-PE-Book 1 sets out methodological approaches to the CIA based on the following requirements:

- IFC PS-1 [1];
- International Finance Corporation Guidelines: Performance Standards on Environmental and Social Sustainability, PS-1, P37-P43 [2];
- "Assessment and management of cumulative impacts: a guide for the private sector in emerging markets" [3].

9.12.1 Determining the scope of work, stage 1

9.12.1.1 Detection of CESC[11]

CESC – recipients and factors (elements) of the natural environment, the consideration of which is advisable as part of the CIA.

According to [3], the CIA includes impacts that are recognized as important based on scientific concepts and/or problems of the affected communities.

The CIA does not consider potential impacts that may occur without the project and/or independently of the project.

Identification of the CESC is carried out taking into account:

- the results of consultations with stakeholders (see Section 5 128-1105- ESIA-PE-Book 1);
- the results of the analysis of the forecast of impacts on environmental components (see Section 9).

If the impact on a recipient is assessed as "negligible" or "low", then the corresponding recipient is not classified as CESC.

As a result of using this approach, the following CESCS (components of the natural environment and natural-anthropogenic objects) were considered within the framework of the CIA:

- atmospheric air (chemical composition and acoustic parameters);
- surface water bodies;

[11] This section examines the CESCs related to the natural environment.

9.12.1.2 Justification of spatial frameworks

Section 8.1. presents the characteristics of the zone of influence on the natural environment. An analysis of the localization of elements that form the zone of influence shows that its boundaries are determined by:

- the zone of influence of the company's emissions of pollutants into the atmosphere;
- the zone of acoustic discomfort generated by the noise sources of the enterprise;

9.12.1.3 Justification of time frames

SD-1 of the IFC requires consideration of ongoing or planned activities that are not directly related to the project, which are being implemented, planned or can be reasonably predicted.

In accordance with the recommendations [4], it is advisable to consider ongoing/existing projects/facilities, as well as projects whose implementation is expected to begin within 5 years from the completion of the CIA. The rationale for the five-year lag is based on the assumption that beyond this lag, the amount of uncertainty significantly worsens the quality of the forecast.

The time frame is also determined by the availability and quality of source data on existing facilities and/or prospective projects.

According to the recommendations [3], it is advisable to use the stages of the life cycle of an enterprise project as a time frame.

Considering that the project should be implemented within 5 years, it is proposed to use this period of time as the forecast period for the CIA.

9.12.2 Determining the scope of work, stage 2

Taking into account the incomparability of the characteristics (scale) of the impacts of the stages of construction and operation of the enterprise on the components of the natural environment, within the framework of the CIA, the analysis is carried out for the stage of operation of the enterprise.

The formalized CIA scheme can be characterized as follows:

Cumulative effects=Impacts of the Project +"External" objects/projects]

Major sources of environmental impact in the north-eastern industrial zone of Jizzakh city are such enterprises as: battery production, reinforced concrete factories, oil depots, textile production, oil extraction production, etc. Inorganic dust, cement dust, nitrogen oxides, sulfur, carbon, and aromatic hydrocarbons are released into the atmosphere of the area from the listed sources of exposure.

According to the Decree of the President of the Republic of Uzbekistan No. DP- 4516 dated on March 15, 2013 and Resolution of the Cabinet of Ministers No. 190 dated July 1, 2013, "Jizzakh" special industrial zone (SIZ) has been established in the city.

In Jizzakh city, as in other developed cities, motor transport accounts for more than 80% of all emissions of pollutants. During the combustion of fuel with exhaust gases, nitrogen and carbon oxides, hydrocarbons and products of their incomplete combustion, lead compounds and benz(a)pyrene enter the atmosphere.

There are no stationary (systematic) observations of the level of atmospheric pollution in Jizzakh.

Based on the National Report on the state of the environment and the use of natural resources in the Republic of Uzbekistan (2008-2011) in Jizzakh region, the degree of load on solid particles is small, emissions of nitrogen oxides, sulfur dioxide, and volatile organic compounds are low.

The emissions of these enterprises contain carbon monoxide, dust, nitrogen oxides, sulfur dioxide, hydrocarbons, soot and aldehydes. Highways of regional importance are characterized by low traffic intensity and are a source of dusting and emissions by mobile vehicles of carbon oxides, nitrogen, hydrocarbons, sulfur dioxide and solid particles.

Freight and passenger transportation of both urban and regional significance is carried out by automobile enterprises of various departmental subordination, as well as small private enterprises and firms. Automobile enterprises and gas stations are scattered throughout the republic. Fuel combustion products and hydrocarbons enter the atmosphere from these facilities.

During the design consultations with the population of makhallas located in the zone of influence of the enterprise, many complaints were expressed about the impact and unpleasant smell from the landfill located in the northeast of the projected facility. It is noted that a particularly intense effect in the form of an unpleasant smell is felt in the evening.

The following "external" sources of atmospheric air pollution are also important for CIA:

- in terms of chemical pollution:

- individual residential sector – a significant part of households is heated in the cold season with the help of stoves;

- in terms of chemical and acoustic pollution:

- road transport;

- railway transport.

One of the sources of pollution of water bodies is surface runoff from the municipal

territory, as well as sites of industrial and municipal enterprises.

Rain, thawed and irrigation waters are polluted with suspended particles of inorganic and organic origin, characterized by a high content of petroleum products, suspended solids, and in some cases bacterial contamination.

These drains are diverted without treatment into irrigation channels.

The enterprise's activities are also associated with impact on surface water bodies:

- irrigation canal – organized drainage of industrial, conditionally clean wastewater.

9.12.3 Determination of the background state of the CESC

As part of the ESIA, chemical pollution of atmospheric air was monitored from April to July 2024. The purpose of the research is to obtain up–to-date and reliable information on the level of cumulative chemical pollution of the atmosphere in the area of the enterprise location.

In the course of these works, in particular,:

- measurements of concentrations of nitrogen oxides, sulfur dioxide, carbon monoxide, suspended particles PM1, PM2,5 and PM10 using the Zephyr compact air quality monitor. The total duration of monitoring is 2 months. To determine the impact of the Jizzakh PPE, and other sources of cumulative effects on atmospheric air, near the project area.

Information on background chemical pollution of atmospheric air, taking into account cumulative effects, is summarized in Section 6.10.1 of Report 125-1105-ESIA-PE- Book 2.

The state of surface waters is discussed in Section 6.10.3 of Report 125-1105-ESIA-PE-Book 2 and in Section 9.4 of this report.

9.12.4 Results of the cumulative impact assessment

The matrix of CIA results (characteristics of cumulative effects on environmental components) is given in Table 9.12.1 (Table 9.12.1).

It has been established that the cumulative effect of the planned activity on the atmospheric air is estimated as moderate. Residual effects are also assessed as moderate.

The cumulative effect on the waters of the irrigation canal is associated with the discharge of wastewater (channel).

In both cases, the effects on the channel, including residual ones, are assessed as low.

It is proposed to continue the studies of the canal water quality initiated within the framework of the ESIA and provide for:

- production control at wastewater discharges;
- monitoring pollution levels in background and control sections.

Based on the results of monitoring the waters of the canal, it is recommended to assess the feasibility of developing and implementing a set of additional compensatory water protection measures (if necessary).

Table 9.12.1 Matrix of cumulative impact assessment results

Life cycle stage: operation

Recipient: population

Recipient sensitivity: average

Characteristics of impacts

Impact	Chemical pollution of atmospheric air		**Orientation**	**Genesis**	**Mechanism**
			Negative	Direct	Cumulative
Primary impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	regional	Long-term	Reversible	Medium	Moderate
Consequences	Indirect impacts on population health, flora and fauna, soils				
Activities	• production control at the sources of pollutant emissions • monitoring of the level of atmospheric air pollution at TNPC • development and implementation of a set of additional compensatory air protection measures (if necessary)				
Residual impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Long-term	Reversible	Medium	Moderate

Impact	Acoustic pollution of atmospheric air		**Orientation**	**Genesis**	**Mechanism**
			Negative	Direct	Cumulative
Primary impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	regional	Long-term	Reversible	Medium	Moderate
Consequences	Indirect impacts on population health				
Activities	• industrial control at noise sources • monitoring of the noise level at the TNPC • development and implementation of a set of additional compensatory noise protection measures (if necessary)				
Residual impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Long-term	Reversible	Medium	Moderate

Life cycle stage: operation

Recipient: irrigation canal

Recipient sensitivity: average

Characteristics of impacts

Impact	Chemical water pollution		**Orientation**	**Genesis**	**Mechanism**
			Negative	Direct	Cumulative
Primary impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Regional	Long-term	Reversible	Medium	Moderate
Consequences	Indirect impacts on human health, aquatic organisms				
Activities	• Industrial control at wastewater outlets • monitoring pollution levels in background and control sections • development and implementation of a set of additional compensatory water protection measures (if necessary)				
Residual impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Long-term	Reversible	Small	Low

Sources

1. Performance standards for environmental and social sustainability. IFC, 2012
2. International Finance Corporation Guidelines: Environmental and Social Sustainability Performance Standards. IFC, 2012
3. Good Practice Guide “Assessment and Management of cumulative impacts: a guide for the private sector in emerging markets”. IFC, 2013
4. Guidelines for the assessment of indirect and cumulative impacts, as well as interactions under exposure, Report prepared by Haider for the DG XI of the European Commission, Brussels, May 1999.

10 SOCIO-ECONOMIC IMPACT ASSESSMENT

Social impact assessment is a special type of cost-benefit analysis, in which the positive economic results of a project are compared with the social consequences associated with negative impacts.

To assess the potential socio-economic consequences, data and information on the relevant initial characteristics of the social environment have been identified and reviewed. The data is collected and presented at different spatial levels (national, regional and local, depending on the context).

Primary data on socio-economic characteristics were collected in April, May and June 2024. Due to the lack of some official data, measures have been taken to collect relevant information from all available sources.

Observations were carried out on the territory of local communities, meetings and conversations with local governments, as well as a study of traffic intensity in the area of planned activities.

During the work:

- basic socio-economic research and data collection were carried out;
- consultations were held with officials to obtain a description of the socio-economic conditions in the area of the planned activity, in particular in the territories of local communities and the affected farm;
- the condition of roads and other infrastructure that can be used within the framework of the project have been determined.

The following restrictions apply to the work performed:

- in some cases, it was impossible to obtain observational data for a five-year period;
- data is not always available. In this case, if possible, efforts were made to obtain qualitative data (instead of quantitative).

However, these limitations ensure the integrity of the assessment.

10.1 Impact on the labor market

According to the recommendation of the World Bank, jobs should mainly be created through the formation of new enterprises, as well as through the expansion of existing enterprises.

The structural weaknesses of the Uzbek labor market, according to the World Bank, include insignificant incentives to work, there are shortcomings in the qualifications of employees and insufficient opportunities for training technical skills in enterprises.

It is noted that young people who do not have a job or study account for 24% [12]of all youth aged 16-24 years (26.4% in the group from 16 to 29 years). Unemployment is especially high among girls — 4 times higher than among boys. This creates a relatively high unemployment rate among young people, a high proportion of the economically inactive population, as well as limited labor mobility.

The persistence of demographic pressure on the labor market and, consequently, the problem of a shortage of jobs makes it difficult to reduce unemployment.

The World Bank states that the number of jobs in the economy of the RUz created annually should be doubled only in order to take new employees entering the labor market.

Job creation is a significant positive impact associated with the construction of a combined-cycle power plant. The construction phase lasts 36 months from 2024 to 2027. The search and recruitment of personnel is carried out on the basis of the “Regulations on the procedure for the selection and recruitment of personnel at “Cenergo” LLC in accordance with labor legislation”.

When selecting candidates for vacant positions, preference is given to:

1. Persons with higher specialized education (corresponding to the job profile) and work experience in the specialty.

2. Graduates of universities with relevant specialized education.

3. Persons with secondary specialized education (corresponding to the job profile) and work experience in the specialty.

4. College graduates with relevant specialized education, who have completed industrial and pre-graduate practice at the plant.

5. Qualified employees of 5-6 categories who have a profession according to the profile of the plant and work experience.

6. Employees of 3-4 categories who have a profession according to the profile of the plant and work experience in the profession.

The applicant’s business professional qualities are determined during the preliminary interview process.

In the structural unit, where, after a preliminary interview, the applicant is sent to a vacant workplace or position, an interview is also conducted to assess the applicant’s professional qualities and his compliance with the vacancy. Employment is formalized by signing a bilateral employment contract.

10.1.1 Construction stage

During the peak period during the construction phase, the need for labor will be about 650 people.

The construction of the projected facilities will be carried out by personnel working mainly on a shift basis and living in a construction camp built by the Contractor[13], or Jizzakh, since the city is located next to the construction site.

The contracting company will attract qualified personnel from other regions of Uzbekistan, citizens of the Republic of Uzbekistan who have gained the necessary experience and qualifications at previous facilities and China.[14]

[12] https://documents.worldbank.org/en/publication/documents- reports/documentdetail/235891634705237783/youth-employment-in-uzbekistan-opportunities-and-challenges

[13] The land plot for the construction of the Contractor's camp was not allocated by the Khokimiyat of the district at the time of the assessment, so the exact location is not known.

[14] At the time of the event, a contract was signed with the contractor China Energy ZTPC

It is assumed that some of the construction workers hired from among the residents of Sharaf-Rashidov district and Jizzakh city will be unskilled labor.

Given the total number of people employed in the construction industry of the district, the involvement of labor resources in the construction of the facility may cause short-term positive changes in the labor market.

10.1.2 Operational stage

The combined-cycle power plant will be put into operation in 2027.

The total demand of the project for labor resources for the period of operation is 70 people, of which 65 people are workers and 5 managers, specialists and employees. The total number of workplaces created under the combined–cycle power plant project is 70 units.

The maximum number of permanent production staff will be reached in 2027, when the facility will be put into operation.

It is assumed that, as in the case of construction workers, local residents (i.e. residents of Sharaf-Rashidov district and Jizzakh city) will be involved as production (if there is a special technical education) and maintenance personnel.

As of January 2024, the average monthly salary in Sharaf-Rashidov district amounted to 2 743 000 UZS.

It is assumed that due to the implementation of the project, the average nominal wage level will increase at the regional level and rise to the level of wages in Jizzakh city.

Due to the implementation of the project, a positive indirect impact on the activities of power plant suppliers and electricity consumers is predicted, as well as the formation of an induced effect (consumer expenses of employees and companies of suppliers and customers).

The effect is manifested in the indicators of workplaces created in related industries, according to international estimates (World Steel Association), the indicator for power plants is 14.7 workplaces.

This means that the implementation of the project will ensure the creation of new workplaces in related industries for more than 1000 people.

Additional jobs are mainly for enterprises in the energy and transport sectors of the economy.

The emergence of jobs at the enterprise will create new workplaces in the service sector (for example, in catering or retail enterprises).

Taking into account the fact that one workplace in industry creates, on average, 3 workplaces in the service sector, additional employment of about 210 people is projected (Table 10.1.1).

Table 10.1.1 The impact of the project on employment, people.

Employment at the power plant	70
Employment in related industries	1000
Employment in the service sector	210
Total employment as a result of the project implementation	1280

Thus, as a result of the project implementation, it is expected to provide jobs for at least 1280 people, which will increase the employment rate of the working-age population.

When compared with the number of unemployed (8.5 thousand people in Sharaf-Rashidov district, see Table 16, 125-1105-ESIA-PE-0, Book 2), providing jobs can potentially reduce the unemployment rate by 15%.

10.1.3 Recommendations

10.1.3.1 Measures to prevent and mitigate impacts

As a result of the consideration of the impacts on the labor market, positive impacts at the construction and operation stages have been identified.

It is recommended to encourage the recruitment of qualified personnel, both at the construction stage and at the operation stage, among the able-bodied population of Sharaf-Rashidov district and Jizzakh city to reduce unemployment rate among the population, improve living standards in the area of planned activity, reduce migration outflow of the population and minimize social tension in society.

Measures to enhance the positive effects of training and advanced training are discussed in section 10.3.3.1

10.1.3.2 Monitoring and reporting

To stimulate the positive effects associated with the impact on the labor market, it is recommended (Table 10.1.2):

- to develop and implement the personnel policy of “Cenergo” LLC, which will continue to apply to the terminal and ensure compliance with the requirements of the IFC and ILO PS-2, including transparent and open recruitment mechanisms, the principles of combating child and forced labor, the principles of non-discrimination and equal opportunities based on gender, nationality, ethnicity, race or religion; prohibition of any form of harassment in the workplace, a mechanism for reviewing employee complaints and defining clear responsibilities for their implementation;
- provide for the implementation and introduction of the social and environmental policy of “Cenergo” LLC, including training obligations, the creation of a transparent hiring procedure among residents of the region (including women, youth, representatives of vulnerable groups of the population).

10.1.4 Assessment results

It has been established that the positive impact of the planned activity on the labor market is of moderate importance, both at the construction stage and at the operational stage.

Sources

1. World Bank Report of September 2021 “Youth Employment in Uzbekistan”

Table 10.1.2 Measures to prevent and mitigate labor market impacts

Item	Activity/ process	Task	Measures	Applicable requirements	Monitoring	Method of implementation / reporting
I.	**Construction stage**					
1.	Construction works (earthworks, general construction works)	To conduct a priority reception of Project personnel among the able-bodied population of the Sharaf-Rashidov district and Jizzakh city	Implementation of the personnel policy of the Enterprise, which includes transparent mechanisms and open mechanisms for hiring personnel. realization and implementation of socio-environmental policy of the enterprise. providing reliable information about the enterprise activities in a timely and complete manner to all Stakeholders	- IFC PS-2 National requirements: - Labor Code of the Republic of Uzbekistan, 1996 - Law of the Republic of Uzbekistan “On employment of the population” No. 510-XII dated on 13/01/1992	- Operational control of the human resources department - accounting for complaints and suggestions from the population and staff with monthly reporting on the resolution of issues	- Grievance mechanisms (GRM) for the Project staff and the enterprise as a whole, a separate GRM for the public - compliance with the requirements of national legislation in the field of employment - Training program, procedures and conditions for the selection of specialists among the residents of the region (including women, youth, representatives of vulnerable groups of the population)
II.	**Operational stage**					

Item	Activity/ process	Task	Measures	Applicable requirements	Monitoring	Method of implementation / reporting
2.	Main production activity (electricity generation) Provision of the main activity – repair work, water supply, sanitation, water supply, cleaning of the territory and industrial premises Transport and logistics (delivery of raw materials, petroleum, oil and lubricants, other transportation, storage of hazardous materials);	Priority recruitment of Project personnel among the able-bodied population of Sharaf-Rashidov district and Jizzakh city	Updating the personnel policy of the enterprise, which includes transparent mechanisms and open mechanisms for hiring personnel. realization and implementation of socio-environmental policy of the ENTERPRISE. providing reliable information about the ENTERPRISE activities in a timely and complete manner to all Stakeholders	IFC PS-2 National requirements: - Labor Code of the Republic of Uzbekistan, 1996 - Law of the RUz “On employment of the population” No. 510-XII dated 13/01/1992	- Operational control of the personnel department of the ENTERPRISE - accounting for complaints and suggestions from the population and staff with monthly reporting on the resolution of issues)	- GRM for the Project personnel and the enterprise as a whole - separate GRM for the population - compliance with the requirements of national legislation in the field of employment - Training program, procedures and conditions for the selection of specialists among the residents of the region (including women, youth, representatives of vulnerable groups of the population)

Table 10.1.3 Matrix of labor market impact assessment results

Life cycle stage: construction

Recipient: able-bodied population

Recipient sensitivity: medium

Characteristics of impacts

Impact	Job creation		**Orientation**	**Genesis**	**Mechanism**
			Positive	Direct	–
Primary impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Regional	Short-term	Reversible	Medium	Moderate
Consequences	None				
Measures	• To develop and implement a personnel policy that will further extend to the enterprise and ensure compliance with the requirements of the IFC and ILO PS-2. • Realization and implementation of social and environmental policy				
Residual impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Regional	Short-term	Reversible	Medium	Moderate

Life cycle stage: exploitation Recipient: able-bodied population Recipient sensitivity: average exposure characteristic

Impact	Job creation		**Orientation**	**Genesis**	**Mechanism**
			Positive	Direct	–
Primary impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Long-term	Reversible	Medium	Moderate
Consequences	None				
Measures	• To develop and implement a personnel policy that will further extend to the enterprise and ensure compliance with the requirements of the IFC and ILO PS-2. • Realization and implementation of social and environmental policy				
Residual impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Long-term	Reversible	Medium	Moderate

10.2 Impact on economic development

The key benefits of the combined cycle power plant construction project related to economic growth include the following aspects:

- increase in the volume of electricity produced, generation of 550 MW;
- the consumption of natural gas per 1 kW/hour is 2.0 times less than in traditional power units and the efficiency is more than 61%, thus saving natural resources
- increase in the revenue side of the country's budget due to the sale of electricity;
- the budget of the Jizzakh region will increase due to an increase in tax revenues associated with the commissioning of the facility (VAT -12%, income tax – 15%, property tax – 1.5%, social tax – 12%), as well as as a result of the indirect impact of the project on the development of the local economy;.

10.2.1 Construction stage

The scale of the project will provide electricity to a number of districts of the Jizzakh region and Jizzakh city.

Construction companies and subcontractors, transport and service organizations will be involved in the construction, construction materials, finished reinforced concrete products and structures, etc. will be purchased on the local market.

Participation in the project will provide additional income, preservation of existing or creation of new workplaces, tax payments to budgets (VAT, income tax, etc.).

Income growth will stimulate the subsequent consumption of goods and services.

10.2.2 Operational stage

The main factors contributing to GDP growth (gross domestic product per employee) are labor productivity growth and employment growth. The project assumes simultaneous growth of employment and labor productivity.

An increase in labor productivity will ensure the creation of more efficient and, accordingly, higher-paying workplaces.

During the period of operation, it is necessary to provide for contributions to the social development of the region /charity in the amount of 2% of net profit in the design calculations.

The implementation of the project will also create an opportunity for socially significant investments and charity. Improving the infrastructure of the Sharaf-Rashidov district and through repairs, reconstruction of highways, as well as the construction of additional facilities to provide electricity.

Additional tax revenues to the budget during the operation of the power plant will increase budget financing for education, health, culture, and social policy, including state benefits and compensation payments to the population at the local, regional, and national levels.

Thus, the wages of those employed in the public sector are increasing, new jobs are being created in social sectors, which affects the level and quality of life of the population: the situation on the labor market is improving and employment income and social transfers to the population are increasing, the availability and quality of social services are increasing.

The project activities will make a significant contribution to increasing income and raising the level of internal solvency of the population of the Sharaf-Rashidov district, as well as the Republic of Uzbekistan as a whole. The growth of household incomes and the expansion of effective demand are the result of paying for the work of those employed in the workplaces created at the projected facilities and the development of current production.

The implementation of the project will give an additional incentive to the development of the energy industry of Uzbekistan, through the implementation and contribution to the development of the "Concept of providing the Republic of Uzbekistan with electric energy for 2020-2030"

10.2.3 Recommendations

10.2.3.1 *Measures to prevent and mitigate impacts*

As a result of the consideration of the impacts on economic development, positive impacts at the construction and operation stages have been identified.

It is recommended to implement and introduce the socio-ecological policy of the project, especially in terms of the system, which includes a training program, a transparent hiring procedure among residents of the region (including women, youth, representatives of vulnerable groups).

10.2.4 Assessment results

It has been established that the impact of the planned activities on economic development is assessed as moderate at the stages of construction and operation.

Table 10.2.1 Matrix of economic development impact assessment results

Life cycle stage: construction

Recipient: Economics

Recipient sensitivity: high

Characteristics of impacts

Impact	Impacts on economic development		**Orientation**	**Genesis**	**Mechanism**
			Positive	Direct	–
Primary impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Short-term	Reversible	Medium	Moderate
Consequences	Provision of electricity to a number of districts of the region Additional payments to budgets of all levels Reduction of natural gas consumption				

Life cycle stage: operation

Recipient: Economics

Recipient sensitivity: medium

Characteristics of impacts

Impact	Impacts on economic development		**Orientation**	**Genesis**	**Mechanism**
			Positive	Direct	–
Primary impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Regional	Long-term	Irreversible	Medium	Moderate
Consequences	Provision of electricity to a number of districts of the region Additional payments to budgets of all levels Reduction of natural gas consumption				

10.3 Impact related to training, professional development

The development of professional skills of personnel is important for ensuring product quality, operational safety and, ultimately, for the economic efficiency of production.

Enterprise management pays attention to hiring educated and qualified personnel. As part of the personnel work, Regulations on rotation, on internship of managerial personnel and on the personnel reserve should be developed and approved.

Training can be carried out by experienced specialists on the basis of the enterprise. For the organization of educational processes, qualified specialists and the necessary conditions for training should be available.

Professional development of specialists and heads of departments is carried out by sending them to similar combined-cycle power plants.

10.3.1 Construction stage

At the construction stage, contractors will involve specialists of construction professions based on the requirements and qualifications necessary for the implementation of the construction process.

Professional development and training of personnel will be carried out on occupational safety and health at construction sites.

There will also be awareness-raising activities and training on the risks of socially-related diseases and ways to control them, interaction with the population of the project area and the Code of Conduct for Contractor Employees.

Already at the construction stage, the training of project personnel for the operational stage will begin.

Providing training is required not only for the launch of production, but also in the future, since improving qualifications, improving management, and replenishing personnel (for example, due to employees retiring and leaving their positions) is a continuous process.

Training program should include:

- theoretical internship;
- internship at a similar enterprise;
- internship at the facility site.

At the final stage of installation and during the commissioning period, a practical internship on equipment designed and supplied by Siemens will be conducted for the staff.

. The positive impact of training and advanced training will also be exerted on newly recruited project personnel selected from the residents of Sharaf-Rashidov district and Jizzakh city.

The implementation of the project will create a demand for skilled labor. This means that the implementation of the project, by presenting a demand for highly qualified labor, will ensure an increase in the educational and qualification level of the labor force and reduce the scale of unskilled labor in the region.

The improvement of professional qualification requirements for employees is an incentive for the development of the vocational education system at the levels of the region and the republic as a whole.

10.3.2 Operational stage.

At the operational stage, advanced training will be required for managerial, administrative, and production personnel, as well as for employees. The introduction of new production

equipment will require appropriate personnel to maintain high standards of professionalism and productivity.

Additional training at the operational stage is also necessary to improve management, replenish the staff due to the retirement of employees and retirement from positions.

Training at the operational stage will have a positive impact on the qualifications of the enterprise personnel, as well as on the development and competitiveness of the enterprise as a whole.

10.3.1 Recommendations

10.3.1.1 Measures to enhance the positive effects

As a result of consideration of the impacts associated with training, positive impacts at the stage of construction and operation have been identified.

To enhance the positive effects, it is recommended to provide for the introduction of testing and qualification exams for project personnel.

10.3.1.2 Monitoring and reporting

Proposals for monitoring and reporting are presented in Table 10.3.2.

10.3.2 Assessment results

It has been established that the positive impact of the planned activities related to training and professional development is assessed as moderate.

Table 10.3.2 Measures to enhance the positive effects of training, professional development

Item	Activity/ process	Task	Measures	Applicable requirements	Monitoring	Method of implementation / reporting
I.	**Operational stage**					
1	Construction works (earthworks, general construction works)	To ensure timely improvement of the educational and qualification level of existing staff and initiate the training of new personnel	To introduce personnel training programs as part of the process of implementing the power plant construction project and ensure timely improvement of the educational and qualification level of existing personnel and training of new personnel. To provide for the implementation of the social and environmental policy of the enterprise, especially with regard to the education of residents of the region (including women, youth, representatives of vulnerable groups of the population)	IFC PS-1 IFC PS-2 National requirements: - Labor Code of the Republic of Uzbekistan, 1996 - Law of the Republic of Uzbekistan “On employment of the population” No. 510-XII dated on 13/01/1992 - Law “On Labor Protection”, 2016	- Accounting of complaints and suggestions from the public and personnel with monthly reporting - personnel testing and qualification exams	- GRM for Project personnel and the enterprise as a whole - separate GRM for the population - compliance with the requirements of national legislation in the field of employment and labor protection - Training program, procedures and conditions for the selection of specialists among the residents of the region (including women, youth, representatives of vulnerable groups of the population)

Table 10.3.3 Matrix of impact assessment results related to training and professional development

Investigated

Recipient: personnel

Recipient sensitivity: medium

Characteristics of impacts

Impact	Impacts related to training and professional development		**Orientation**	**Genesis**	**Mechanism**
			Positive	Direct	–
Primary impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Long-term	Irreversible	Medium	Moderate
Consequences	There are no negative consequences				
Activities	• Improving the educational and qualification levels of existing staff and training new staff • Implementation and introduction of the socio-environmental policy of the project, especially in terms of the system, which includes a training program for residents of the region (including women, youth, representatives of vulnerable groups)				
Residual impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Long-term	Irreversible	Medium	Moderate

10.4 Land acquisition, economic relocation

The project for the construction of combined-cycle gas power plant is being implemented on the territory of a 9.42 ha land plot allocated for construction by the Khokimiyat of Sharaf-Rashidov district on the basis of the decision of the Khokim of the district No. 01-51 dated 30/01/2024.

In fact, according to the document, 9.43 hectares of land belonging to the “Donabek Sano” farm, based on cadastral documentation No. 4429 dated on 31/10/2018, were transferred to the state on a permanent basis, and 2 hectares of land were taken for temporary use and will be returned to the farm after the completion of the construction of the facility.

“Donaboy Samo” farm enterprise specializes in animal husbandry and has been operating since 2012. At first, the farm belonged to son of Ganiev Kholkozi, but after his health deteriorated, he handed over the management of the farm to his elderly father and left for long-term treatment in Turkey. Since then, the farm has been managed by Ganiev Kholkozi.

Before part of the farm’s land was acquired for the power plant construction project, the total area of the farm was 46 hectares. Of these, 4 hectares are irrigated lands, the rest are bogara.

Due to the lack of winter housing, the farmer sold his cattle, and today the farm contains only 120 sheep.

In addition to the family members of the farmer, 2 people officially work on the “Donaboy Samo” farm. Another 15-20 local female employees are also hired to perform one-time and temporary jobs during the season. These employees continue to work, the implementation of the project has not affected their activities on the farm in any way.

Shepherds who used to graze the farm’s cattle today continue to work on other farm lands, that is, they have not lost their jobs.

The main crops – cotton and grain - are not grown on farmland of the farm enterprise. The head of the farm does not know the quality score of his plots.

The Land Code of the RUz provides for the possibility of seizure of land plots for state and public needs. In this context, it means the withdrawal of a plot from private ownership for public needs, by decision of the government, with the consent of the landowner, in compliance with the provisions of the legislation regarding the right of the state to compulsory alienation of property, which provides for immediate and adequate compensation.

Prior to the start of the project, the Khokimiyat of the district held consultations with the farmer, measurements of the land plot and an assessment of the farm’s property.

Based on the assessment report, the amount of compensation amounted to 507 100 000 UZS, the report was agreed upon with the head of the farm and, on the basis of an agreement concluded between the farmer and the Khokimiyat, the amount was paid to the farmer in two stages:

Amount of 400 000 000 UZS - 11/03/2024

Balance in the amount of 107 100 000 UZS - 12/06/2024

The objects associated with the project are a new access road to the power plant with a length of about 90 meters, power transmission lines with a length of approximately 8 and 10 km from the project area to the existing 220 kV power transmission lines L-20-D and L-Z-S, a gas pipeline, a water supply route, tentatively starting from the surface water intake, a water drainage channel of the Jizzakh reservoir, currently at the design and approval stage.

In accordance with the Project Agreement, all connection points and the construction of linear facilities must be provided by local government agencies, gas and water supply organizations, and National electric networks.

It is likely that the construction of infrastructure (associated facilities) will lead to the economic displacement of land users, temporary and permanent alienation of land plots.

But since the routes of linear objects are not currently defined, it is not possible to determine the impact at this stage of the assessment.

According to the results of the survey, at the stage of determining the ESIA research program, the need for relocation in connection with the implementation of the Project was not identified: the nearest residential buildings are removed from the boundaries of the enterprise at a distance of 100 to 500 m.

The construction of the infrastructure of the combined-cycle power plant led to the economic displacement of the land user, according to the results of the survey it was found that compensation payments were made in full, the farm has no claims to the project.

Social audit was conducted in June 2024. Within the framework of which consultations with the district khokimiyat were initiated, and an in-depth interview was conducted with the farm affected by the project to obtain information about the owners and land plots allocated on a permanent or temporary basis, verification of assessment reports and the correctness of the implementation of national legislative procedures, and an analysis of the fulfillment of the requirements of IFC PS-5.

10.4.1 Construction stage

According to the cadastral department of Sharaf-Rashidov district, the project affected 1 land plot, the lands of the "Donabek Sano" farm enterprise.

According to the results of the social audit, it was determined that before the start of construction work, the Khokimiyat of Sharaf-Rashidov district conducted an independent assessment to determine the amount of damage caused to the farm enterprise. Compensation according to an independent assessment has been paid in full, while the farm is satisfied with the result of the assessment in relation to the damage caused.

Thus, the construction of project facilities had an impact related to the alienation of land (temporary and permanent land acquisition), the consequences of which are expressed in the loss of rainfed areas and the demolition of farm buildings.

10.4.2 Operational stage

At the operational stage, the project does not provide for additional land acquisition and/or economic relocation. Production activities are carried out on the territory of the allocated site without expanding the boundaries of the enterprise.

10.4.3 Recommendations

10.4.3.1 Measures to prevent and mitigate impacts

Measures to prevent and mitigate impacts at the construction stage are not considered, since the impact has already occurred, and the alienation of land plots took place in connection with the practical start of work and the decision of the Khokim of the district.

At the stage of operation, the impact on land users is not predicted.

Taking into account the current status of work with the farm enterprise affected by the project, it is recommended:

- to consult with the affected farms to get acquainted with the results of the assessment, provide information about the GRM;
- receiving written confirmation from the farm that there are no claims related to compensation;
- conducting a social audit to determine the residual effects and verify the procedures for implementing the measures discussed above.

10.4.3.2 Monitoring and reporting

In order to exclude adverse consequences associated with the acquisition of land for the project, it is recommended to conduct a social audit and issue an appropriate report.

10.4.4 Assessment results

It has been established that the significance of the impacts of the planned activities related to the acquisition of land is estimated as low.

Sources

1. Data from cadastral authorities and the khokimiyat of Sharaf-Rashidov district (valuation report, cadastral documentation, payment documents).
2. Decisions of the Khokim of Sharaf-Rashidov district on land allocation related to the construction of combined-cycle power plant.

Table 10.4.1 Measures to prevent and mitigate impacts associated with land acquisition and economic displacement

Item	Activity/ process	Task	Measures	Applicable requirements	Monitoring	Method of implementation / reporting
I.	**Construction stage**					
1.	Construction works (earthworks, general construction works)	Ensuring payment of compensation and reimbursement of damage to the affected farm	- Complete census of affected assets - conducting consultations with the affected household to familiarize themselves with the results of the assessment, providing information about the GRM of the project - payment of compensation based on the results of an independent assessment with written confirmation of the absence of claims related to the payment of compensation, conducting a social audit to determine the residual effects and verify the procedures for implementing the measures described above	IFC PS-5 National requirements: - Land Code of the RUz, 1998 - Resolution of the Cabinet of Ministers No. 911 (16/11/2019) - Decree of the President of the Republic of Uzbekistan No. DP-6243 dated on 08/06/2021 - Resolution of the Cabinet of Ministers No. 146 (25/05/2011)	- Accounting of complaints and suggestions from the farm enterprise with monthly reports on the resolution of issues - social audit	- GRM for affected farms - compliance with the requirements of national legislation on land alienation and restoration of livelihoods - report on the results of the social audit

Table 10.4.2 Matrix of impact assessment results from land acquisition, economic displacement

Life cycle stage: construction

Recipient: Farms

Recipient sensitivity: medium

Characteristics of impacts

<table>
<tr><td rowspan="2">Impact</td><td colspan="2" rowspan="2">The impact associated with the alienation of land plots</td><td>Orientation</td><td>Genesis</td><td>Mechanism</td></tr>
<tr><td>Negative</td><td>Direct</td><td>–</td></tr>
<tr><td rowspan="3">Primary impact</td><td>Scale</td><td>Duration</td><td>Reversibility</td><td>Magnitude</td><td>Significance</td></tr>
<tr><td>Local</td><td>Long-term</td><td>Irreversible</td><td>Small</td><td>Low</td></tr>
<tr><td>Consequences</td><td colspan="5">Crop losses, rainfed areas, demolition of farm buildings</td></tr>
<tr><td>Activities</td><td colspan="5">• Census of affected assets
• to consult with the affected farm to get acquainted with the results of the assessment, provide information about the GRM
• payment of compensation based on the results of an independent assessment with written confirmation from the farm that there are no claims related to compensation
• conducting a social audit to determine residual impacts and verify the procedures for implementing measures</td></tr>
</table>

10.5 Labor influx and population change

The implementation of the planned activities will be associated with the influx of a significant number of personnel, which will be especially typical for the construction phase.

Along with employees hired directly by “Cenergo” LLC, employees will also be hired by (sub)contracting organizations, including, with a high degree of probability, from outside the Jizzakh region, with subsequent residence in a construction camp, which will be built for the purposes of the project by the Contractor, in Jizzakh city and Sharaf-Rashidov district.

When considering the issue of living conditions for project personnel, first of all, it is important to consider the relevant international and national regulatory framework. [15] Several international documents recognize the right to an adequate standard of living conditions for each employee as part of the observance of human rights. For employees, recognition of such a right is included in ILO Recommendation 115 “On the conditions of residence of Workers” (1961).

10.5.1 Construction stage

The well-being of local communities and their social context may deteriorate due to the influx of outside labor. The lack of qualified labor resources will contribute to labor migration from other regions of Uzbekistan, possibly from abroad.

The potential beneficial effect of such migration may be to increase demand for locally produced products and services, which may create advantages for small businesses and farms in Jizzakh city and Sharaf-Rashidov district.

Of course, it is preferable to involve local labor, as this has many advantages; not only in terms of reducing the need for housing, but also because it increases direct and indirect benefits for the local population, the approach is supported in all aspects by the EBRD and IFC. However, the requirements for the qualification of personnel, the calendar schedule of the construction stage made it necessary to use the option with the use of shift personnel.

At the initial stage of the project, the question of whether housing for employees is required at all was considered. In this regard, the needs for labor, including skills and likely numbers during the project cycle, were analyzed, and an assessment of the capabilities of the local population to meet these labor needs was carried out.

The influx of labor can lead to conflicts between newcomers and local residents. It is highly likely that these conflicts will be local in nature and will not lead to a significant decrease in the level of security of the population.

An increase in the incidence of socially-related diseases is also possible due to the influx of labor. The risk of this impact can be reduced by implementing within the Project its own program of medical examinations and a management system in the field of protection of employees health, as well as by conducting systematic information and explanatory work to inform employees about the risks of infection with socially conditioned diseases and ways of controlling these risks.

It is necessary to provide mitigating measures in the form of the development and implementation of social assistance programs for vulnerable groups of people. The implementation of these programs will significantly reduce the likelihood of adverse consequences.

10.5.2 Operational stage

[15] https://www.ifc.org/wps/wcm/connect/60593977-91c6-4140-84d3-737d0e203475/workers_accomodation.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-60593977-91c6-4140-84d3-737d0e203475-jqetNIh

At the operational stage, the total number of new workplaces under the project will amount to 70 people, of which 65 (92%) workers and 5 (8%) managers, specialists and employees, including administrative and managerial personnel.

The work and rest schedule of key workers, duty personnel, managers and specialists employed in shifts is adopted in accordance with the operating schedule of the main process equipment - continuous, three-shift, 8-hour, for managers, specialists not employed in shifts, as well as for some repair personnel - a single-shift work schedule with two days off.

The influx of labor in connection with the implementation of the project will lead to a slight increase in the load on social infrastructure facilities such as hospitals and other medical institutions, schools, leisure and recreation facilities, housing, public transport and others.

The analysis carried out at the stage of basic socio-economic research showed that the population of Jizzakh city and Sharaf-Rashidov district is adequately provided with hospitals and polyclinics.

Despite the fact that in the short term, the influx of labor will lead to some increase in the burden on social infrastructure, it can be expected that an increase in demand will lead to infrastructure development, which will provide an additional positive effect.

Based on the assessment provided in 125-1105-ESIA-P0-Book 2, Sections 7.4 and 7.5, it was determined that the average school occupancy in Sharaf-Rashidov district is 585 pupils, which indicates a sufficient number of schools in the district.

At the same time, it is unlikely that the increased burden on social infrastructure in connection with the implementation of the project will lead to a decrease in the welfare of the population. Providing assistance to potentially vulnerable groups of people who may be directly affected by negative impacts will be key.

An increase in inflation, in particular, food and housing prices, can also be caused by an influx of labor and a change in the level of demand. It is unlikely that this impact will actually lead to a decrease in the overall well-being of people, since demand will stimulate additional production and an increase in the number of services provided to the population, but it is necessary to understand that this impact may affect vulnerable groups.

At the stage of operation, there may be unsatisfied expectations of the able–bodied population in the field of employment, as well as dissatisfaction of the local population - those employed within the framework of the project, and those whose applications turned out to be unsuccessful.

10.5.3 Recommendations

10.5.4 Measures to prevent and mitigate impacts

As a result of considering the impacts associated with the influx of labor and population changes and the consequences of these impacts, it is recommended to implement the following measures.

- Construction stage:
  - the goals for hiring local residents will be agreed between the contractor and “Cenergo” LLC. The terms of employment will be determined to manage job expectations, work with the local population (number and type of vacancies) will be carried out with the help of Public Relations Specialist. Unskilled labor will preferably be hired from among the local population affected by the project;
  - social requirements will be included in the procurement process of the project. Taking into account the relevant considerations to increase the well-being of the population of Jizzakh city and Sharaf-Rashidov district, conditions will be created, as necessary, for the purchase of goods and services from economic entities of the district and the city;
  - The policy to exclude alcohol consumption at work sites will be applied by the Contractor. Code of conduct for employees will be prepared and brought to the attention of staff for review, signing and implementation. Within the framework of the project, regular reviews of measures to mitigate the effects on public health and safety will be conducted, as well as consultations with the chairmen of makhallas every six months. The consultations will be aimed at informing about the progress of the project and the results and include discussion of any changes;
  - code of conduct will also include a ban on the use of illegal drugs, bribery and corruption;
  - recreational facilities (recreation facilities, dining room, etc.) should be created on the territory of the construction site.;
  - providing assistance to potentially vulnerable groups of people who may be directly affected by the negative impacts associated with increased burden on infrastructure;
  - development and implementation of a program of medical examinations and a management system in the field of personnel health protection, conducting awareness-raising work on the risks of socially caused diseases and ways to control them.

- Operational stage:
  - with the help of Public Relations Specialist, provide access to employment information, explaining in advance to the local population the number and type of opportunities;
  - create transparent hiring procedures – regarding ethnicity, religion, disability, or gender. Clear job descriptions will be provided before recruitment, which will explain the skills required for each position. Vacancies will be advertised in local communities through publicly available media.

10.5.5 Monitoring and reporting

- Accounting for complaints and suggestions from the public and personnel with monthly reports on resolving issues.
- Program of medical examinations and management systems in the field of employee health protection.
- Development of personnel policy and transparent recruitment procedures.

10.5.6 Assessment results

It is established that the significance of the negative impacts of the planned activity in connection with the influx of labor is estimated as low.

Table 10.5.1 Measures to prevent and mitigate impacts related to the influx of labor and population change

Item	Activity/ process	Task	Measures	Applicable requirements	Monitoring	Method of implementation / reporting
I.	**Construction stage**					
1.	Construction works (earthworks, general construction works)	Prevention and mitigation of impacts on the population and infrastructure due to the influx of labor and population growth	- The policy to exclude alcohol consumption at work sites will be applied by the Contractor. Code of conduct for employees will be prepared and brought to the attention of staff for review, signing and implementation. Within the framework of the project, regular reviews of measures to mitigate the effects on public health and safety will be conducted, as well as consultations with the chairmen of makhallas every six months. The consultations will be aimed at informing about the progress of the project and the results and include discussion of any changes; - Code of Conduct will also include a ban on the use of illegal drugs, bribery and corruption - recreational facilities (recreation facilities, dining room, showers, etc.) should be created on the territory of the construction site. - providing assistance to potentially vulnerable groups of people who may be directly affected by the negative impacts associated with an increase in the burden on infrastructure - Development and implementation of a program of medical examinations and a management system in the field of personnel health protection, conducting awareness-raising work on the risks of socially caused diseases and ways to control them	IFC PS-1 IFC PS-2 IFC PS-4 National requirements: - Labor Code of the Republic of Uzbekistan, 1996 - Law of the Republic of Uzbekistan “On employment of the population” No. 510-XII dated on 13/01/1992 - Law “On Labor Protection”, 2016. - Law “On the protection of citizens’ health” dated 29/08/1996	- Accounting for complaints and suggestions from the population and staff with monthly reporting on the resolution of issues - results of medical examinations of personnel health	- GM for project staff and the public - Public health and Safety Plan
II.	**Operational stage**					
2.	Main production activity (electricity generation) Provision of the main activity – repair work, water supply, sanitation, water supply, cleaning of the territory and industrial premises Transport and logistics (delivery of raw materials, petroleum, oil and lubricants, other transportation, storage of hazardous materials);	Managing the employment expectations of the local population and implementing transparent selection procedures	- Creation of transparent recruitment procedures – regarding ethnicity, religion, disability or gender - clear job descriptions will be provided before recruitment, which will explain the skills required for each position - vacancies will be announced in local communities through public media and consultation meetings	IFC PS-1 IFC PS-2 IFC PS-4 National requirements: - Labor Code of the Republic of Uzbekistan, 1996 - Law of the Republic of Uzbekistan “On employment of the population” No. 510-XII dated on 13/01/1992 - Law “On Labor Protection”, 2016. - Law “On the protection of citizens’ health” dated 29/08/1996	Accounting for complaints and suggestions from the public and personnel with monthly reports on resolving issues	GM for project staff and the public Compliance with the requirements of national labor legislation

Table 10.5.2 Matrix of the results of the assessment of the impact of the influx of labor and population change

Life cycle stage: construction

Recipient: population

Recipient sensitivity: medium

Characteristics of impacts

Impact	Impact of labor influx		**Orientation**	**Genesis**	**Mechanism**
			Negative	Indirect	–
Primary impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Short-term	Reversible	Medium	Moderate
Consequences	• The emergence of conflicts with local residents • The increase in the incidence of socially-related diseases • The increase in the burden on social infrastructure facilities				
Activities	• Development and implementation of its own medical examination program and management system in the field of employee health protection within the framework of the Project • Conducting systematic information and explanatory work to inform personnel about the risks of infection with socially caused diseases and ways to control them • development and implementation of social assistance programs for vulnerable groups • development and implementation of the Personnel Code of Conduct				
Residual impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Short-term	Reversible	Small	Low

Life cycle stage: operation

Recipient: population

Recipient sensitivity: medium

Characteristics of impacts

Impact	The impact of the influx of labor and population changes		**Orientation**	**Genesis**	**Mechanism**
			Negative	Indirect	–
Primary impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Long-term	Reversible	Small	Low
Consequences	The increase in the burden on social infrastructure facilities				
Activities	• Development and implementation of social assistance programs for vulnerable groups				
Residual impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Long-term	Reversible	Small	Low

10.6 Child and forced labor

Project task – to prevent any form of child and forced labor in the supply chain and project activities.

Uzbekistan has ratified eight fundamental ILO conventions that address the “basic labor standards”, including provisions on child and forced labor (for more information, see 125-1105-ESIA-PE- Book 1, Section 2).

Permanent large-scale seasonal employment in construction and agriculture creates a risk of using child and forced labor for the project. According to reports from NGOs and human rights defenders, there is also information that forced labor is still a problem in Uzbekistan.

Migrants, seasonal workers, public sector workers and subcontractors, as well as children are considered highly sensitive because they are at risk.

Given the ongoing efforts of the Government, civil society and the international community to eliminate the problem of child and forced labor in Uzbekistan, the significance of this potential impact is projected to be relatively low.

10.6.1 Construction stage

The main impacts of the planned activities at the construction stage are related to the provision of services by contractors and the supply of products by suppliers using child and forced labor.

In order to prevent any forms of child and forced labor at the stage of construction of a combined cycle power plant, it is necessary to develop procedures for screening contractors and include provisions on child and forced labor in contracts with suppliers and contractors, and to determine measures of influence for their violation.

10.6.2 Operational stage

The risk and impact of any form of child or forced labour during the operational phase of the power plant is unlikely, as the HR Policy will ensure that the project as a whole does not involve the use of child or forced labour, and will also reflect in the policy national and international requirements for personnel and supply chain workers who are not in an employment relationship.

A grievance mechanism available to all project workers, including contract and subcontractor workers, as well as supply chain workers (discussed in Section 10.8) they will also help to minimize this risk.

10.6.3 Recommendations

10.6.3.1 Measures to prevent and mitigate impacts

As a result of consideration of the impacts associated with child and forced labor and the consequences of these impacts, it is recommended to implement the following preventive measures.

- Construction stage:
  - include in the Personnel Policy the principles of equal working conditions, excluding discrimination, child and forced labor, violation of the rights of personnel;
  - Oblige contractors and subcontractors to adhere to the Human Resources Policy of the Project through the provisions of the contract;
  - Develop the Contractor's Code of Conduct and familiarize employees and contractors with it;
  - contracts with suppliers and contractors should contain provisions on child and forced labor and define penalties for their violation;
  - establish an employee grievance mechanism that is accessible to all employees, including contract and subcontract workers and supply chain personnel;
  - create an identity card system for all project employees and keep up-to-date (daily) records of persons working at project facilities at any given time;
  - appoint at least two labor and social affairs officers who will be responsible for monitoring contractors and their subcontractors (during the construction phase) in ensuring compliance with the personnel management policy;
  - report to local authorities and relevant authorities the cases of child and forced labor or any suspicion of them
  - report to international lenders on the results of monitoring during the construction period in relation to child and forced labor as part of the mandatory reporting under loan agreements.
- Operational stage:
  - Human Resources Policy should exclude the use of child or forced labor in the project and in the enterprise, and also reflect in this policy national and international requirements for workers who are not in an employment relationship and for workers in the supply chain;
  - establish and implement workers grievance mechanism that is accessible to all project workers, including contract and subcontract workers, as well as supply chain workers. Moreover, workers should not be restricted from joining or forming workers' organizations, or from bargaining for collective agreements.

10.6.3.2 *Monitoring and reporting*

- Accounting for complaints and suggestions from the public and personnel with monthly reports on resolving issues;
- Monthly social monitoring reports, including an assessment of the effectiveness of measures to prevent forced and child labor.

10.6.4 Assessment results

It is established that the significance of the impacts of the planned activities related to child and forced labor is estimated as low.

Table 10.6.1 Measures to prevent and mitigate the impacts of child and forced labour

Item	Activity/ process	Task	Measures	Applicable requirements	Monitoring	Method of implementation / reporting
I.	**Construction stage**					
1.	Construction works (earthworks, general construction works)	Prevention of child and forced labor	- Introduction of the principles of equal working conditions into the Personnel Policy, excluding discrimination, child and forced labor, violation of personnel rights - requirements for contractors to adhere to the personnel policy of the project through the provisions of the contract - develop a Contractor Code of Conduct and familiarize all employees and contractors with it; contracts with suppliers and contractors must contain provisions on child and forced labor and define measures of influence for their violation - create grievance mechanism accessible to project personnel, including contract and subcontractor workers, as well as supply chain workers - create an identity card system for all project employees and keep up-to-date (daily) records of persons working at the project facilities; - appoint at least two labor and social affairs officers who will be responsible for monitoring the activities of contractors and their subcontractors (during the construction phase) in relation to personnel management policies - report to local authorities and relevant authorities the cases of child and forced labor or any suspicion of them - to inform creditors about the results of monitoring during the construction period in relation to child and forced labor within the framework of mandatory reporting	IFC PS-1 IFC PS-2 Forced Labour Convention No. 29, (1930) - Protocol of 2014 to the Forced Labor Convention (1930) Abolition of Forced Labour Convention No.105, (1957) Worst Forms of Child Labour Convention No. 182, (1999) Minimum Age Convention No. 138 (1973) National requirements: - Labor Code of the Republic of Uzbekistan, 1996 - Law of the Republic of Uzbekistan “On employment of the population” No. 510-XII dated on 13/01/1992 - Law “On Labor Protection”, 2016.	- Accounting for complaints and suggestions from the public and personnel with monthly reports on resolving issues - monthly reports on social monitoring, including the implementation of measures to prevent forced and child labor.	-GRM for project personnel and the public - fulfillment of the national legislation on labor activity requirements - Personnel policy - Contractor Code of Conduct
II.	**Operational stage**					
2.	Main production activity (electricity generation) Provision of the main activity – repair work, water supply, sanitation, water supply, cleaning of the territory and industrial premises Transport and logistics (delivery of raw materials, petroleum, oil and lubricants, other transportation, storage of hazardous materials);	Prevention of child and forced labor	- The Human Resources Policy should exclude the use of child or forced labor in the project and in the enterprise, and also reflect in this policy national and international requirements for workers who are not in an employment relationship and for workers in the supply chain - establish and implement workers grievance mechanism that is accessible to all project workers, including contract and subcontract workers, as well as supply chain workers. Moreover, workers should not be restricted from joining or forming workers’ organizations, or from bargaining for collective agreements	IFC PS-1 IFC PS-2 Forced Labour Convention No. 29, (1930) - Protocol of 2014 to the Forced Labor Convention (1930) Abolition of Forced Labour Convention No.105, (1957) Worst Forms of Child Labour Convention No. 182, (1999) Minimum Age Convention No. 138 (1973) National requirements: - Labor Code of the Republic of Uzbekistan, 1996 - Law of the Republic of Uzbekistan “On employment of the population” No. 510-XII dated on 13/01/1992 - Law “On Labor Protection”, 2016.	- Accounting for complaints and suggestions from the public and personnel with monthly reports on resolving issues	- GM for project staff and the public - fulfillment of the national legislation on labor activity requirements

Table 10.6.2 Matrix of impact assessment results related to child and forced labour

Life cycle stage: construction

Recipient: personnel

Recipient sensitivity: medium

Characteristics of impacts

Impact	Impacts related to child and forced labor		**Orientation**	**Genesis**	**Mechanism**
			Negative	Direct	–
Primary impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Short-term	Reversible	Small	Low
Consequences	Violations of the principles of equal working conditions, discrimination, violations of staff rights				
Activities	• Include into the Personnel Policy the principles of equal working conditions, excluding discrimination, child and forced labor, personnel rights violation • Oblige contractors and subcontractors to adhere to the Human Resources Policy of the Project through the provisions of the contract • Develop the Contractor's Code of Conduct and familiarize employees and contractors with it • Contracts with suppliers and contractors should contain provisions on child and forced labor and define penalties for their violation; • Establish workers' grievance mechanism that is accessible to all employees, including contracted and subcontracted workers, as well as supply chain personnel;				
Residual impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Long-term	Reversible	Small	Low

Life cycle stage: operation

Recipient: personnel

Recipient sensitivity: medium

Characteristics of impacts

Impact	Impacts related to child and forced labor		**Orientation**	**Genesis**	**Mechanism**
			Negative	Direct	–
Primary impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Short-term	Reversible	Small	Low
Consequences	Violations of the principles of equal working conditions, discrimination, violations of staff rights				
Measures	• Include into the Personnel Policy the principles of equal working conditions, excluding discrimination, child and forced labor, personnel rights violation; • Contracts with suppliers and contractors should contain provisions on child and forced labor and define penalties for their violation; • Establish an employee grievance mechanism that is accessible to all employees, including contract and subcontract workers and supply chain personnel;				
Residual impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Long-term	Reversible	Small	Low

10.7 Impact on access to transport infrastructure

The following aspects of the project could potentially have an impact on social facilities and transport infrastructure:

- carrying out work on moving soil/excavation, transportation of bulky equipment may inadvertently damage existing infrastructure.

10.7.1 Construction stage

During peak periods of construction and commissioning of the facility in 2026-2027, traffic intensity is projected to increase by approximately 30% of the current level (see Table 10.710.7.1, 125-1105-ESIA-PE-Book 2).

Potential impacts:

- road surface wear/degradation – when using the road network to access the project area;
- traffic jams and delays (road closures), especially during periods of delivery of oversized and/or heavy goods.

10.7.2 Operational stage

No significant impact on access to infrastructure and its deterioration during the operational phase is expected.

10.7.3 Recommendations

10.7.3.1 Measures to prevent and mitigate impacts

As a result of considering the impacts associated with access to infrastructure, as well as the consequences of these impacts, it is recommended to implement the following measures.

- Construction stage:
  - contractor will ensure the preparation and implementation of Traffic Management Plan (TMP), which will be approved by “Cenergo” LLC and the relevant regulatory authority in Uzbekistan for traffic control;
  - ensuring the safe movement of vehicles through detours or temporary access roads (if necessary);
  - proper road signs, lighting, well designed road safety signs, signallers to direct traffic.
  - periodic inspection and restoration of worn-out pavement due to the equity participation of the project.

10.7.3.2 Monitoring and reporting

- Accounting for complaints and suggestions from the population and staff with monthly reporting on the resolution of issues;
- report on the implementation of the Traffic Management Plan

10.7.4 Assessment results

It has been established that the significance of the impact of the planned activity on access to transport infrastructure is assessed as low, both at the construction stage and at the operational stage.

Table 10.7.1 Measures to prevent and mitigate impacts related to access to transport infrastructure

Item	Activity/ process	Task	Measures	Applicable requirements	Monitoring	Method of implementation / reporting
I.	**Construction stage**					
1.	Construction works (earthworks, general construction works)	Prevention and mitigation of impacts on transport infrastructure	- The Contractor will ensure the preparation and implementation of the Traffic Management Plan (TMP), which will be approved by “Cenergo” LLC and the relevant regulatory body in Uzbekistan for traffic control - ensuring unimpeded and safe movement of traffic through bypasses or temporary access roads (if necessary) - proper road signs, lighting, well thought out road safety signs, signalmen to control traffic	IFC PS-1 IFC PS-4 National requirements: - Law “On the protection of citizens’ health” dated 29/08/1996	- Accounting for complaints and suggestions from the population and staff with monthly reporting on the resolution of issues - results of medical examinations of employees health.	- Accounting for complaints and suggestions from the population and staff with monthly reporting on the resolution of issues; -Report on the implementation of the Traffic Management Plan
II.	**Operational stage**					
2.	Main production activity (electricity generation) Provision of the main activity – repair work, water supply, sanitation, water supply, cleaning of the territory and industrial premises Transportation and logistics (delivery of raw materials, fuels and lubricants, other transportation, storage of hazardous materials)	Prevention and mitigation of impacts on transport infrastructure	Preparation and implementation of optimal logistics schemes and Traffic Management Plan for the transportation of heavy goods	IFC PS-1 IFC PS-4 National requirements: - Law “On the protection of citizens’ health” dated 29/08/1996	- Accounting for complaints and suggestions from the public and personnel with monthly reports on resolving issues	- Accounting for complaints and suggestions from the population and staff with monthly reporting on the resolution of issues; -Report on the implementation of the Traffic Management Plan

Table 10.7.2 Matrix of impact assessment results on access to transport infrastructure

Life cycle stage: construction

Recipient: municipal infrastructure

Recipient sensitivity: high

Characteristics of impacts

Impact	Impacts on access to infrastructure		**Orientation**	**Genesis**	**Mechanism**
			Negative	Direct	–
Primary impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Short-term	Reversible	Small	Moderate
Consequences	• Impact on road infrastructure • Impact on traffic				
Measures	• Preparation and implementation of the Traffic Management Plan (TMP) • Ensuring unhindered and safe movement of traffic through detours or temporary access roads (if necessary); • Proper road signs, lighting, well designed road safety signs, signallers to direct traffic				
Residual impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Short-term	Reversible	Minor	Low

Life cycle stage: operation

Recipient: municipal infrastructure

Recipient sensitivity: high

Characteristics of impacts

Impact	Impacts on access to infrastructure		**Orientation**	**Genesis**	**Mechanism**
			Negative	Direct	–
Primary impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Long-term	Reversible	Small	Moderate
Consequences	• Impact on road infrastructure • Impact on traffic				
Measures	• Preparation and implementation of the Traffic Management Plan (TMP) • Preparation and implementation of optimal logistics schemes				
Residual impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Long-term	Reversible	Minor	Low

10.8 Supply chain impacts

The social and environmental risks and impacts of the project supply chain are associated with suppliers of goods and services necessary for the implementation of the project. One of the objectives of the IFC PS-2 is to ensure the protection of workers, including vulnerable categories such as children, migrant workers, workers employed by third parties, as well as workers in the customer's supply chain.

The supply chain extends to equipment, materials, components, goods or products used in current activities.

The supply chain of goods may include suppliers of raw materials and suppliers of parts and components for assembly and production.

The term "primary supplier" refers to those suppliers who provide goods and materials required for the project's core business processes.

The supply chain of the Project can be complex and consist of a large number of suppliers of different levels. It is difficult to assess the full supply chain of a project, and areas of risk and impact are usually identified.

Supplier activity monitoring should be integrated into the overall Project management system. This will help determine if mitigation procedures and measures are being implemented correctly, and provide feedback on new areas of risk and hazard.

10.8.1 Construction stage

The IFC PS-2 chain of custody requirements do not apply to materials and components used during the construction phase of the project.

The main social and environmental impacts and risks associated with the supply chain during the construction phase may include child and forced labour in the provision of services by contractors and the delivery of products by suppliers, in addition to where there is a high level of risk to the safety of workers in the supply chain. "Cenergo" LLC must introduce procedures and take measures to reduce the level of risk, ensuring that key suppliers and contractors take measures to prevent or eliminate situations that pose a threat to life.

The ability to completely eliminate these risks will depend on the level of administrative control or degree of influence over key suppliers and contractors. Where corrective actions are difficult to implement, "Cenergo" LLC should, over time, reorient the chain to suppliers and contractors who can demonstrate that they are capable of meeting the requirements of IFC PS-2.

The table below examines the main environmental requirements of "Cenergo" LLC for contractors and suppliers.

Table 10.8.1 Environmental requirements for suppliers of "Cenergo" LLC

Requirements for contractors and suppliers of raw materials, equipment, services	
Groups of requirements	**Requirements for contractors**

General requirements	- Availability of a certified environmental management system and/or a certified integrated management system (HSE) - Availability of an environmental management system and/or an integrated management system (HSE) - availability of standards and procedures in the field of HSE
Requirements for construction contractors	- Maximum possible use of local raw materials for construction work - emergency preparedness - the presence of system for handling hazardous materials and substances (if their use is necessary) - liquidation of temporary infrastructure facilities taking into account the possibility of reuse
Preventing climate change	- Availability of PG management system - accounting of fuel and energy consumption, transfer of this data to "Cenergo" LLC for climate reporting purposes on a regular basis - the use of technologies, equipment and practices that involve the use of renewable energy sources - use of electric, hybrid, biofuel and/or gas vehicles
Resource conservation	Use of water efficiency measures in contractors/suppliers' operations (reduction of water consumption and conservation of water resources, for example, through the use of rainwater harvesting and use, as well as the introduction of recirculating water systems)
Waste management	- Availability of a waste management system - application of technologies and materials that involve the use of secondary raw materials - use of complexes for processing solid municipal and biological waste - use of waste-free and low-waste technologies in construction - availability of waste separation system - availability of waste composting solutions - waste management in the areas of consumer services, food and cleaning - liquidation of temporary infrastructure facilities taking into account the possibility of reuse - availability of equipment (technologies) for waste processing that meet environmental requirements[16] - availability of waste transportation vehicles that meet environmental requirements[17] - availability of waste disposal facilities that meet environmental requirements[18]
Requirements for equipment, materials and raw materials	
Use of hazardous/toxic substances	- refusal to use materials/raw materials recognized as hazardous or toxic to humans or polluting the environment (if there are reasonable alternatives) - refusal to use ozone-depleting substances
Energy efficiency and resource conservation	- Use of certified technologies (equipment) in the field of energy, heat and water conservation

[16] For contractors engaged in waste processing.
[17] For contractors involved in waste transportation
[18] For contractors involved in waste disposal

As determined by IFC PS-2, Cenergo LLC must conduct due diligence in its supply chain to avoid receiving benefits or financial gain from such practices.

The project should make special efforts and conduct additional due diligence where such practices are widespread or known to exist at certain levels of the supply chain in specific industries or regions.

The financial benefit of child and forced labor is a specific risk where labor cost is one of the project competitiveness factors.

The project must make the most of its influence to eliminate child and forced labor in its supply chain. It is also necessary to take measures to prevent or eliminate life-threatening situations within the supply chain.

Implementation procedures, such as procurement procedures, will ensure that child and forced labor requirements and labor safety issues are included in orders and contracts with suppliers.

10.8.2 Operational stage

During the operation phase, the same risks and impacts are considered as during the construction phase.

10.8.3 Recommendations

10.8.3.1 Measures to prevent and mitigate impacts

Based on the consideration of supply chain related impacts and the consequences of these impacts, the following measures are recommended to be implemented.

- Construction stage:
  - develop and implement environmental and social criteria for selecting suppliers/contractors;
  - include in the Personnel Policy the principles of equal working conditions, excluding discrimination, child and forced labor;
  - oblige contractors, subcontractors and suppliers of the Project to adhere to the personnel policy of the Project through the provisions of the contract;
  - contracts with suppliers and contractors must contain provisions on child and forced labor, labor safety, and define measures of influence for their violation;
  - creation of a publicly accessible mechanism for dealing with complaints from staff, including employees working under contracts and subcontracts, as well as supply chain workers;
  - inform creditors of the results of monitoring during the construction period regarding child and forced labor as part of mandatory reporting under loan agreements;

- take measures to prevent or eliminate situations within the supply chain that pose a risk to the health and life of personnel.

- Operational stage:

At the operational stage, the same measures are considered as at the construction stage.

10.8.3.2 Monitoring and reporting

- Accounting for complaints and suggestions from the population and staff with monthly reporting on the resolution of issues;
- Monthly reports on social monitoring, including the implementation of measures to prevent forced and child labor.

10.8.4 Assessment results

It was found that the significance of the impacts of the planned activity related to the supply chain is assessed as moderate at the construction stage and low at the operational stage.

Table 10.8.2 Measures to prevent and mitigate impacts related to supply chains

Item	Activity/ process	Task	Measures	Applicable requirements	Monitoring	Method of implementation / reporting
I.	**Stages of construction, operation**					
1.	Construction works (earthworks, general construction works)	Eliminating child and forced labor from the supply chain	- Develop and introduce environmental and social criteria for selecting suppliers/contractors - include in the Personnel Policy the principles of equal working conditions, excluding discrimination, child and forced labor - oblige contractors, subcontractors and suppliers of the Project to adhere to the personnel policy of the Project through the provisions of the contract - contracts with suppliers and contractors must contain provisions on child and forced labor, labor safety, and define measures of influence for their violation - creation of a publicly accessible mechanism for dealing with complaints from staff, including employees working under contracts and subcontracts, as well as supply chain workers - inform creditors of the results of monitoring during the construction period regarding child and forced labor as part of mandatory reporting under loan agreements - measures to prevent or eliminate situations within the supply chain that pose a risk to the health and life of personnel - development and implementation of environmental requirements for suppliers in accordance with Table 10.8.1 - taking measures to prevent or eliminate situations within the supply chain that pose a danger to the health and life of personnel.	IFC PS-1 IFC PS-2 Forced Labour Convention No. 29, (1930) - Protocol of 2014 to the Forced Labor Convention (1930) Abolition of Forced Labour Convention No.105, (1957) Worst Forms of Child Labour Convention No. 182, (1999) Minimum Age Convention No. 138 (1973) National requirements: - Labor Code of the Republic of Uzbekistan, 1996 - Law of the Republic of Uzbekistan “On employment of the population” No. 510-XII dated on 13/01/1992 - Law “On Labor Protection”, 2016.	- Accounting for complaints and suggestions from the population and staff with monthly reporting on the resolution of issues - monthly reports on social monitoring, including the implementation of measures to prevent forced and child labor	-GRM for project personnel and the public - fulfillment of the national legislation on labor activity requirements - Personnel policy - Contractor Code of Conduct

2.	Main production activity (electricity generation) Provision of the main activity – repair work, water supply, sanitation, water supply, cleaning of the territory and industrial premises Transportation and logistics (delivery of raw materials and supplies, fuels and lubricants, other transportation, storage of hazardous materials)					

Table 10.8.3 Matrix of supply chain impact assessment results

Life cycle stages: construction, operation

Recipients: business entities, personnel

Recipient sensitivity: average

Characteristics of impacts

<table>
<tr><td rowspan="2">Impact</td><td colspan="2" rowspan="2">Supply chain impacts</td><td>Orientation</td><td>Genesis</td><td>Mechanism</td></tr>
<tr><td>Negative</td><td>Indirect</td><td>–</td></tr>
<tr><td rowspan="2">Primary impact</td><td>Scale</td><td>Duration</td><td>Reversibility</td><td>Magnitude</td><td>Significance</td></tr>
<tr><td>Regional</td><td>Short term and long term</td><td>Reversible</td><td>Medium</td><td>Moderate</td></tr>
<tr><td>Consequences</td><td colspan="5">Indirect impacts from violation of equal working conditions principles that exclude discrimination, child and forced labor, violation of personnel rights in the supply chain, indirect consequences for components of the natural environment</td></tr>
<tr><td>Activities</td><td colspan="5">• Develop and introduce environmental and social criteria for selecting suppliers/contractors
• include in the Personnel Policy the principles of equal working conditions, excluding discrimination, child and forced labor
• oblige contractors, subcontractors and suppliers of the Project to adhere to the personnel policy of the Project through the provisions of the contract
• contracts with suppliers and contractors must contain provisions on child and forced labor, labor safety, and define measures of influence for their violation
• creation of a publicly accessible mechanism for dealing with complaints from staff, including employees working under contracts and subcontracts, as well as supply chain workers
• inform creditors of the results of monitoring during the construction period regarding child and forced labor as part of mandatory reporting under loan agreements
• measures to prevent or eliminate situations within the supply chain that pose a risk to the health and life of personnel</td></tr>
<tr><td rowspan="2">Residual impact</td><td>Scale</td><td>Duration</td><td>Reversibility</td><td>Magnitude</td><td>Significance</td></tr>
<tr><td>Regional</td><td>Short term and long term</td><td>Reversible</td><td>Small</td><td>Low</td></tr>
</table>

10.9 Cultural heritage

The impact associated with construction work on the designated site is considered.

Since the construction site is located on an agricultural territory that has been developed for many decades, the impact on the archaeological and cultural heritage on the territory of the construction site is considered to be minimal.

10.9.1 Construction stage

When studying the project documentation and holding a consultation meeting with the head of the Agency for Cultural Heritage of the Jizzakh Region, an answer was received about significant cultural and archaeological heritage sites located in this area.

The agency has provided information on the location of 3 cultural heritage sites located at a distance of over 5 kilometers from the construction site.

10.9.2 Operational stage

Impact on cultural heritage at the operational stage is not predicted (excluded).

10.9.3 Recommendations

10.9.3.1 Measures to prevent and mitigate impacts

Based on the above data, in accordance with PS-8, it is advisable to include a Procedure for detecting accidental finds in the Environmental and Social Management Plan.

10.9.3.2 Monitoring and reporting

Provide reporting on the implementation of the Procedure for the detection of accidental finds.

10.9.4 Assessment results

It has been established that the impact of the planned activity on cultural heritage is assessed as negligible.

10.10 Workers' rights, safety and labor protection

Occupational health and safety in industrial activities remains a serious problem in Uzbekistan. The practice of fulfilling safety and labor protection requirements by contractors and subcontractors of the RUz is assessed as insufficiently effective. These issues should be considered not only for the personnel of "Cenergo" LLC, but also for contractors.

10.10.1 Construction stage

It is expected that during the peak construction period, at least 650 workplaces will be created within the framework of the project, the duration of which is directly related to the construction period of the power plant. The majority of the workers will be engaged by the Contractor and will consist of unskilled and skilled labor.

Expected impacts include the operation of heavy machinery and transport, working at height, construction work, the use of electrical equipment, the handling of hazardous materials and other hazardous activities.

Due to the nature of the activities carried out during the construction phase, the safety of personnel is a key risk with the possibility of accidents that can lead to injury and death, as well as loss of working time.

Occupational Health and Safety (OHS) will be prepared by the Contractor prior to commencement of construction work.

The Contractor must ensure strict implementation of the OHS plan through its occupational safety and health officer.

In addition, the Contractor will conduct a series of training courses and safety meetings.

The Contractor will regularly inspect, test and maintain all security equipment (including fire-fighting equipment), scaffolding, fencing, work platforms, lifts, stairs and other means of access, lifting, lighting, marking and security equipment

Employees (before the work starts) will be provided with appropriate PPE free of charge suitable for performing electrical work, such as protective boots, harnesses, helmets, gloves, protective clothing, goggles and protective headphones.

With regard to the rights of workers and personnel, the Contractor must ensure that the following measures are implemented:

- The provisions in the Contractors' contract should include, as far as practicable, clauses to address issues related to collective bargaining, downsizing, placement of employees and shortage of employees, to ensure compliance with the requirements of the ILO and IFC;
- development and implementation by the Contractor of a Personnel policy for hiring, training, evaluation and remuneration of the project workforce;
- the Policy should prevent all employees of any form of discrimination in the workplace and ensure fair and equal treatment;
- establishing a grievance mechanism so that employees can raise reasonable workplace issues. The contractor will inform employees about the complaint mechanism when hiring and make it easily accessible to them;

- employees will not be restricted in joining or creating workers' organizations, as well as in negotiating collective agreements, and the Contractor will not discriminate against employees who form or join collectives or conclude collective agreements;
- preparing a redundancy plan to mitigate the impact of sudden termination of employment contracts, including, for example and where appropriate, the implementation of a transparent redundancy process and labour consultation mechanisms. The contractor will explain the temporary nature of the workplaces during the hiring process and will explain to workers the need to prepare for job loss and manage their income wisely while employed.

All employees will have contracts describing their job responsibilities and working conditions, as well as explaining their content. The contractor will hire a group of occupational health and safety specialists to implement and manage the above tasks.

All subcontractors of the project will be provided with copies of the ESEMP (Environmental and Social Environment Management Plan) of the Contractor. All subcontracts will include provisions ensuring compliance with the ESEMP at all levels of subcontracting.

All subcontractors will have to appoint a safety officer who will be on the Construction Site for the duration of the relevant subcontract. To implement the above points, the contractor will appoint qualified personnel for environmental protection, health and safety at work.

10.10.2 Operational stage

Occupational health and safety management will be carried out in accordance with national regulatory documents and at the operational stage of the project.

The process of improving working conditions must be carried out systematically. In order to achieve sound SP conditions, it is necessary to finance the establishment of permanent mechanisms for their review, planning, implementation, evaluation and appropriate action.

This should be achieved through the establishment of occupational health and safety management systems.

The selection and implementation of specific measures to prevent industrial injuries and diseases among workers depends on the main hazardous factors and expected injuries and diseases.

The main hazardous production factors are:

- natural gas leak and gas contamination;
- steam leak;

- electricity;
- explosion and flame;
- location of work places and equipment at height.

Harmful factors of the production process, if exposed to a person over a long period of time and intensively, can lead to the development of occupational diseases in the worker. These factors include:

- thermal, ultraviolet, ionizing and other radiation;
- electromagnetic fields;

  dust and gas released into the atmosphere of the production premises;
- high level of noise and vibration, ultrasound.

The personnel of combined cycle power plant will be exposed to all of the above factors.

The probability of exposure to each hazardous factor should be assessed in accordance with the provisions of the instructions of the International Labour Organization "Occupational safety when working with chemicals" and "Environmental factors in the workplace", or other provisions of equal or greater importance.

Activities to assess the effects of hazardous factors are carried out by competent persons in the process of certification and inspection of workplaces with the provision of information to staff about the results of the assessment.

Ensuring safe working conditions includes timely staff training and periodic monitoring of staff knowledge, training in first aid rules, and regular medical examinations of staff.

It is recommended to develop and implement a long-term training program in the field of OHS, provided by specialists in the relevant field of OHS.

The expected impact on the health, safety and labor protection of personnel at the operational stage is as follows:

- risks for employees in connection with hazardous work;
- the impact on the health of personnel due to dangerous and harmful production factors of
- violation of workers' rights.

The proposed mitigation measures described should help reduce the risk of incidents.

10.10.3 Recommendations

10.10.3.1 Measures to prevent and mitigate impacts

As a result of considering the health, safety and environmental impacts, as well as the consequences of these impacts, it is recommended to implement the following measures.

- Construction stage:
  - The Occupational Health and Safety Plan (OHS) will be prepared by the Contractor;
  - The contractor will conduct a series of safety training courses;
  - regular inspection, testing and maintenance of all safety equipment (including fire-fighting equipment), scaffolding, fencing, work platforms, lifts, stairs and other means of access, lifting, lighting, marking and security equipment;
  - employees will be provided with appropriate PPE suitable for work, such as safety boots, harnesses, helmets, gloves, protective clothing, safety glasses and protective headphones;

- keeping logs of briefings, training records, and safety-related incidents, including incidents close to omissions;
- development and implementation by the contractor of a Personnel Policy for hiring, training, evaluation and remuneration of the project workforce, preventing any form of discrimination in the workplace and ensuring fair and equal treatment of all employees;
- grievance mechanism to enable workers to raise workplace issues;
- the possibility of joining or creating workers organizations, as well as negotiating collective agreements.

- Operational stage:
  - Occupational Health and Safety Plan (OHS) will be prepared;
  - conducting training courses and safety meetings on an ongoing basis;
  - conducting periodic monitoring of personnel knowledge, training in the rules of first aid, regular medical examinations of personnel, primarily those employed in hot shops.
  - provision of appropriate PPE suitable for basic jobs such as safety boots, harnesses, helmets, gloves, protective clothing, safety glasses and protective headphones;
  - development and implementation by the contractor of a Personnel Policy for hiring, training, evaluation and remuneration of the project workforce, preventing any form of discrimination in the workplace and ensuring fair and equal treatment of all employees;
  - employee grievance mechanism; informing employees about the grievance mechanism during employment.
  - training in first aid rules,
  - regular medical examinations of personnel.

10.10.3.2 *Monitoring and reporting*

- Accounting for complaints and suggestions of staff with monthly reporting on resolving issues;
- monthly reports on the implementation of the Occupational Health and Safety (OHS) Plan.
- analysis of incidents at the enterprise
- training in occupational health and safety (OHS) with subsequent knowledge testing

Suggestions for monitoring and reporting are presented in Table 10.10.1

10.10.4 **Assessment results**

It has been established that the significance of residual impacts on the rights, health, safety and labor protection of personnel is assessed as follows:

- at the construction stage – negligible;
- at the operation stage – low.

Table 10.10.1 Measures to prevent and mitigate impacts related to workers' rights, health and safety issues

Item	Activity/ process	Task	Measures	Applicable requirements	Monitoring	Method of implementation / reporting
I.	**Construction stage**					
1.	Construction works (earthworks, general construction works)	Ensuring the safety and health of the personnel, implementation of OHS	- Preparation of the Occupational Health and Safety (OHS) Plan by the Contractor - conducting training courses on safety precautions - regular inspection, testing and maintenance of all safety equipment (including fire-fighting equipment), scaffolding, fencing, work platforms, lifts, stairs and other means of access, lifting, lighting, marking and security equipment - providing personnel with appropriate PPE suitable for the work performed, such as safety boots, harnesses, helmets, gloves, protective clothing, safety glasses and ear protection; - keeping logs of briefings, training records, and safety-related incidents, including incidents close to omissions - development and implementation by the contractor of a Personnel Policy for hiring, training, evaluation and remuneration of the project workforce, preventing any form of discrimination in the workplace and ensuring fair and equal treatment of all employees - grievance mechanism to enable workers to raise workplace issues - the possibility of joining or creating workers organizations, as well as negotiating collective agreements	- IFC PS-1 - IFC PS-2 - IFC PS-4 National requirements: - Labor Code of the Republic of Uzbekistan, 1996. - Law of the Republic of Uzbekistan "On employment of the population" No. 510-XII dated on 13/01/1992 - Law "On Labor Protection", 2016.	- Accounting for complaints and suggestions of staff with monthly reporting on resolving issues - Monthly reports on the implementation of the Occupational Health and Safety (OHS) Plan analysis of incidents at the enterprise, training in occupational health and safety (OHS) with subsequent knowledge testing	- GRM for project personnel and the public - fulfillment of the national legislation on labor activity requirements - Personnel policy - Contractor Code of Conduct - The Occupational Health and Safety (OHS) plan
II.	**Operational stage**					
2.	Main production activity (electricity generation) Provision of the main activity – repair work, water supply, sanitation, water supply, cleaning of the territory and industrial premises Transport and logistics (delivery of raw materials, petroleum, oil and lubricants, other transportation, storage of hazardous materials);	Ensuring the safety and health of the personnel, implementation of OHS	- Preparation of the Occupational Health and Safety (OHS) Plan - conducting training courses and safety meetings on an ongoing basis; - conducting periodic monitoring of personnel knowledge, training in first aid rules, regular medical examinations of personnel. - provision of appropriate PPE suitable for basic jobs such as safety boots, harnesses, helmets, gloves, protective clothing, safety glasses and protective headphones - development and implementation by the contractor of a Personnel Policy for hiring, training, evaluation and remuneration of the project workforce, preventing any form of discrimination in the workplace and ensuring fair and equal treatment of all employees; - employee grievance mechanism; informing employees about the grievance mechanism during employment. - training in first aid rules - regular medical examinations of staff, first of all.	- IFC PS-1 - IFC PS-2 - IFC PS-4 National requirements: - Labor Code of the Republic of Uzbekistan, 1996. - Law of the RUz "On employment of the population" No. 510-XII dated on 13/01/1992 - Law "On Labor Protection", 2016. Appendix No. 1 to the Resolution of the CM of the RUz No. 263 dated on 15/09/2014 Regulation on the procedure for certification of workplaces for working conditions and equipment hazards	- Accounting for complaints and suggestions of staff with monthly reporting on resolving issues - Monthly reports on the implementation of the Occupational Health and Safety (OHS) Plan - analysis of incidents at the enterprise, training in occupational health and safety (OHS) with subsequent knowledge testing	GM for project staff and the public Compliance with the requirements of national labor legislation - The Occupational Health and Safety (OHS) plan

Table 10.10.2 Matrix of the results of the assessment of impacts related to workers' rights, health and safety issues

Life cycle stage: construction

Recipient: personnel

Recipient sensitivity: medium

Characteristics of impacts

Impact	Impacts related to workers' rights, health and safety issues		**Orientation**	**Genesis**	**Mechanism**
			Negative	Direct	–
Primary impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Short-term	Not applicable	Small	Low
Consequences	Impact on personnel health				
Activities	• The Occupational Health and Safety Plan (OHS) will be prepared by the Contractor • The contractor will conduct a series of safety training courses • regular inspection, testing and maintenance of all safety equipment (including fire-fighting equipment), scaffolding, fencing, work platforms, lifts, stairs and other means of access, lifting, lighting, marking and security equipment • employees will be provided with appropriate PPE suitable for work, such as safety boots, harnesses, helmets, gloves, protective clothing, safety glasses and protective headphones • keeping logs of briefings, training records, and safety-related incidents, including incidents close to omissions • development and implementation by the contractor of a Personnel Policy for hiring, training, evaluation and remuneration of the project workforce, preventing any form of discrimination in the workplace and ensuring fair and equal treatment of all employees • grievance mechanism to enable workers to raise workplace issues • the possibility of joining or creating workers organizations, as well as negotiating collective agreements				
Residual impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Short-term	Not applicable	Insignificant	Negligible

Life cycle stage: operation

Recipient: personnel

Recipient sensitivity: medium

Characteristics of impacts

Impact	Impacts related to workers' rights, health and safety issues		**Orientation**	**Genesis**	**Mechanism**
			Negative	Direct	–
Primary impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Long-term	Not applicable	Small	Moderate
Consequences	Impact on personnel health				
Activities	• Preparation of the Occupational Health and Safety (OHS) Plan • conducting safety training courses on an ongoing basis • conducting periodic monitoring of personnel knowledge, training in first aid rules, regular medical examinations of personnel • provision of appropriate PPE suitable for all types of work, such as protective boots, harnesses, helmets, gloves, protective clothing, safety glasses and protective headphones • development and implementation by the contractor of a Personnel Policy for hiring, training, evaluation and remuneration of the project workforce, preventing any form of discrimination in the workplace and ensuring fair and equal treatment of all employees; • grievance mechanism • informing employees about the grievance mechanism during employment				
Residual impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Long-term	Not applicable	Minor	Low

10.11 Health, safety and wellbeing of the population

This section discusses the impacts of the project on the health, safety and welfare of the population and the corresponding measures to prevent/mitigate them.

Aspects of the project that have potential impacts on public health and safety:

- increase in the intensity of motor vehicle traffic, especially heavy vehicles and equipment;
- accidental situations;
- chemical and acoustic pollution of atmospheric air;
- actions of the Contractor's personnel and security service.

10.11.1 Construction stage

Potential impacts on public safety:

- conflicts between construction site and camp security and safety personnel, workers and local residents (risk of injury);
- an increase in the intensity of traffic flows on roads used by the population means – an increased risk of road accidents leading to accidents and, potentially, injuries or deaths.

Potential public health impacts:

- an increase in the number of disease vectors, such as rodents (if food/drinks are stored incorrectly and solid/liquid waste is not managed properly), with a concomitant increase in the incidence of vector-borne diseases;
- an increase in the number of cases of infectious diseases as a result of interaction between workers and the local population. With a potential peak population of 850 people (mainly men), there is a risk of infectious diseases spread (for example, tuberculosis and sexually transmitted diseases such as HIV, etc.);
- risk of water-borne diseases in case of inefficient waste management;
- increased pollution levels due to increased traffic and transportation of construction materials.

10.11.2 Operational stage

The risk of multi-mediated exposure due to aerogenic precipitation, contamination of drinking water, and food is predicted to a lesser extent.,

The health of the population is interconnected with the state of the environment. Ecologically determined classes of diseases are able to vividly indicate the impact of the environment on the health of the population. The most sensitive to the effects of environmental factors are the hematopoietic, cardiovascular, central nervous, genitourinary systems, as well as the respiratory organs.

According to baseline studies (see report 125-1105-ESIA-PE-Book 2), in the area of the planned activity, classes of diseases (diseases of the respiratory system, diseases of the blood and diseases of the hematopoietic organs) are more pronounced, largely associated, among other things, with environmental conditions, in particular, with the level of air pollution and the lifestyle of the population.

Accordingly, activities to organize health monitoring of the population of the Sharaf-Rashidov district are of priority importance for the project. The main tasks of monitoring are monitoring of health impact factors (atmospheric air quality), assessment of the predicted state of health and planning of measures aimed at improving the health of the population.

10.11.3 Recommendations

10.11.3.1 Measures to prevent and mitigate impacts

As a result of consideration of the impacts related to the health, safety and well-being of the population, as well as the consequences of these impacts, it is recommended to implement the following measures.

- Construction stage:
  - carrying out work in accordance with safety standards and regulations and national regulations;
  - The contractor, as part of the implementation of the environmental and social management plan, will prepare and implement a public health and safety management plan;
  - set out in the Code of Conduct the rules, ethical obligations, clear and accessible disciplinary procedures related to the activities of the security service;
  - mandatory requirement for security service employees to undergo regular professional training (indicating the type and frequency of training, as well as the proportion of employees who have completed the training);
  - policy governing the "use of force" and clear provisions regarding proportionality to risk. When ensuring security, the use of force by security personnel is permitted only for preventive and defensive purposes and must be proportionate to the nature and scale of the risks;
  - GRM implementation;
  - consultation and review of measures to mitigate impacts on public health and safety;
  - Construction road warning signs will be placed at road crossings and other locations specified by the traffic management plan, such as along access roads before they are used by construction vehicles;
  - in areas where schools are located in close proximity to the road, explanatory work on safety issues will be carried out;
  - the movement of vehicles will be limited to certain access roads and designated working areas (except in emergency cases);
  - development and implementation of programs to train and inform employees about the risks and prevention measures associated with sexually transmitted diseases, including HIV and other infectious diseases (eg. tuberculosis). Information on diseases and preventive measures will be provided to communities living near the construction camp.
- Operational stage:
  - monitoring the health of the population of the Sharaf-Rashidov district, joint work of “Cenergo” LLC and the sanitary and epidemiological welfare and public health service of the Sharaf-Rashidov district,
  - measures provided for by decisions on the protection of atmospheric air from chemical and acoustic influences (see Sections 9.1, 9.3).

10.11.3.2 Monitoring and reporting

Activities may include:

- monitoring of factors harmful to humans and their assessment;
- identification of urgent and long-term measures to prevent and eliminate the impact of

harmful factors on population health;

- development of proposals for decision-making in the area of ensuring the sanitary and epidemiological well-being of the population;
- informing government bodies, local government bodies, organizations and the population about the results obtained during monitoring.

Reporting suggestions:

- accounting for complaints and suggestions from the population with monthly reporting on resolving issues;
- monthly reports on the implementation of the Public Health and Safety Plan.
- reports on monitoring the health of the population of the Sharaf-Rashidov district.

10.11.4 Assessment results

It has been established that the significance of the impacts of the planned activity on the health, safety and well-being of the population is assessed as negligible at the construction stage and low at the operation stage.

Table 10.11.1 Measures to prevent and mitigate impacts related to the health, safety and well-being of the population

Item	Activity/ process	Task	Measures	Applicable requirements	Monitoring	Method of implementation / reporting
I.	**Construction stage**					
1.	Construction works (earthworks, general construction works)	Ensuring the population safety, health and well-being	- The contractor, as part of the implementation of the environmental and social management plan, will prepare and implement a public health and safety management plan - GRM implementation - consultation and review of measures to mitigate impacts on public health and safety - construction road warning signs will be placed at road crossings and other locations specified by the project, such as along access roads before they are used by construction vehicles - in areas where schools and markets are located in close proximity to the road, explanatory work on safety issues will be carried out - the movement of vehicles will be limited to certain access roads and designated working areas (except in emergency cases) - development and implementation of programs to train and inform employees about the risks and prevention measures associated with sexually transmitted diseases, including HIV and other infectious diseases (eg. tuberculosis). Information on diseases and preventive measures will be provided to communities living near the construction camp - set out in the Code of Conduct the rules, ethical obligations, clear and accessible disciplinary procedures related to the activities of the security service - mandatory requirement for security service employees to undergo regular professional training (indicating the type and frequency of training, as well as the proportion of employees who have completed the training); - policy governing the "use of force" and clear provisions regarding proportionality to risk. When ensuring security, the use of force by security personnel is permitted only for preventive and defensive purposes and must be proportionate to the nature and scale of the risks	- IFC PS-1 - IFC PS-4 - National requirements Law “On the protection of citizens’ health” dated on 29/08/1996	- Accounting for complaints and suggestions from the population with monthly reporting on resolving issues - monthly reports on the implementation of the Public Health and Safety Plan.	- GRM for the public - fulfillment of the requirements of national legislation on the public health protection - Contractor Code of Conduct - Public Health and Safety Plan
II.	**Operational stage**					
2.	Main production activity (electricity production) Provision of the main activity – repair work, water supply, sanitation, water supply, cleaning of the territory and industrial premises Transport and logistics (delivery of raw materials, petroleum, oil and lubricants, other transportation, storage of hazardous materials);	Ensuring the population safety, health and well-being	- measures provided for by decisions on the protection of atmospheric air from chemical and acoustic influences (see Sections 9.1, 9.3)	- IFC PS-1 - IFC PS-4 National requirements: - Law “On the protection of citizens’ health” dated 29/08/1996	Monitoring of factors harmful to humans and their assessment - identification of urgent and long-term measures to prevent and eliminate the impact of harmful factors on population health - development of proposals for decision-making in the area of ensuring the sanitary and epidemiological well-being of the population - informing government bodies, local government bodies, organizations and the population about the results obtained during monitoring	- GRM for the population - reporting on monitoring results - Public Health and Safety Plan

Table 10.11.2 Population Health, Safety and Welfare Impact Assessment Results Matrix.

Life cycle stage: construction

Recipient: population

Recipient sensitivity: high

Characteristics of impacts

Impact	Impacts on public health, safety and welfare		**Orientation**	**Genesis**	**Mechanism**
			Negative	Direct	–
Primary impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Short-term	Irreversible	Small	Moderate
Consequences	Deterioration of public health, injuries, fatalities				
Activities	• The contractor, as part of the implementation of the environmental and social management plan, will prepare and implement a public health and safety management plan • GRM implementation • consultation and review of measures to mitigate impacts on public health and safety • construction road warning signs will be placed at road crossings and other locations specified by the project, such as along access roads before they are used by construction vehicles • in areas where schools and markets are located in close proximity to the road, explanatory work on safety issues will be carried out • the movement of vehicles will be limited to certain access roads and designated working areas (except in emergency cases) • development and implementation of programs to train and inform employees about the risks and prevention measures associated with sexually transmitted diseases, including HIV and other infectious diseases (eg. tuberculosis). Information on diseases and preventive measures will be provided to communities living near the construction camp • - set out in the Code of Conduct the rules, ethical obligations, clear and accessible disciplinary procedures related to the activities of the security service • - mandatory requirement for security service employees to undergo regular professional training (indicating the type and frequency of training, as well as the proportion of employees who have completed the training) • - policy governing the "use of force" and clear provisions regarding proportionality to risk. When ensuring security, the use of force by security personnel is permitted only for preventive and defensive purposes and must be proportionate to the nature and scale of the risks				
Residual impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Long-term	Irreversible	Minor	Negligible

Life cycle stage: operation

Recipient: population

Recipient sensitivity: high

Characteristics of impacts

Impact	Inhalation and acoustic effects on various population groups.		**Orientation**	**Genesis**	**Mechanism**
			Negative	Direct	–
Primary impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Long-term	Irreversible	Small	Moderate
Consequences	Deterioration of public health, injuries, fatalities				
Activities	• measures provided for by decisions on the protection of atmospheric air from chemical and acoustic influences (see Sections 9.1, 9.3)				
Residual impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Long-term	Irreversible	Minor	Low

10.12 Cumulative impacts

10.12.1 Determining the scope of work, stage 1

10.12.1.1 Detection of CESC[19]

CESC – recipients and factors (elements) of the social environment, the consideration of which is advisable as part of the CIA.

In line with the Good Practice Guidance on Assessing and Managing Cumulative Impacts: A Guide for the Private Sector in Emerging Markets (IFC, 2013), the CIA includes impacts that are considered important based on scientific concepts and/or the concerns of affected communities.

The CIA does not consider potential impacts that may occur without the project and/or independently of the project.

Identification of the CESC is carried out taking into account:

- the results of consultations with stakeholders (see Section 5 125-1105-ESIA-PE-Book1);
- results of the forecast of impacts on the social environment (see Section 10).

As noted above, if the impact is assessed as "negligible" or "low", then the corresponding recipient is not classified as a CESC.

The main recipients include components of the social environment, such as personnel, population, infrastructure, as well as socio-economic factors (living conditions of the population, including employment, demographic shifts, social infrastructure, ethnic characteristics, etc.).

As a result of using the specified approach within the framework of the CIA, the following CESC components of the social environment were considered:

- labor market;
- transport infrastructure;
- social infrastructure.

10.12.1.2 Justification of spatial frameworks

Section 8 presents the characteristics of the zone of influence on the social environment. An analysis of the localization of elements that form the zone of influence shows that its boundaries are determined by:

- industrial site of combined-cycle power plant;
- Contractor's construction camp;

[19] This section examines the CESCs related to the surrounding social environment.

- municipal territories – makhallas adjacent to the industrial site, within the boundaries of the SPZ;
- zone of indirect influence of the project (includes Jizzakh city as a whole, Sharaf-Rashidov district of Jizzakh region).

10.12.1.3 Justification of time frames

The time frame for the assessment is adopted in accordance with the approach discussed above in Section 9.12.1.

10.12.2 Determining the scope of work, stage 2

CIA of the social environment is carried out for the construction and operation stages of the project.

It is stated above that the implementation of the project, in particular the creation of jobs, has a significant positive impact on the labor market at the level of Jizzakh city and Sharaf-Rashidov district.

It is expected that during the construction stage, some of the construction workers will be hired from among the residents of the Sharaf-Rashidov district and Jizzakh city, which will ensure short-term positive changes in the labor market.

At the operational stage, the creation of jobs at the power plant will create new jobs in the service sector (for example, in the catering industry or retail outlets). Considering that one job in production creates, on average, 3 workplaces in the service sector, additional employment of about 210 people is predicted.

It was also established that the significance of the negative impacts of the planned activity at the operational stage in connection with the influx of labor into the social infrastructure is assessed as moderate.

The influx of labor in connection with the implementation of the project will lead to a slight increase in the load on social infrastructure facilities such as hospitals and other medical institutions, schools, leisure and recreation facilities, housing, public transport and others.

Project aspects such as the transportation of large equipment and cargo, as well as during the construction phase, will impact the transport infrastructure, in particular the road surface (wear/degradation) and traffic volume (traffic jams, traffic delays). The significance of the impact of the planned activity on access to transport infrastructure is assessed as moderate, both at the construction and operational stages.

During peak periods of construction and commissioning of the facility in 2026-2027, traffic intensity is projected to increase by approximately 30% of the current level.

No significant impact on access to transport infrastructure is expected during the operational phase.

10.12.3 Determination of the background state of the CESC

Labor force and employment, access to public and social services, and transport infrastructure are discussed in Section 7 of Report 125-1105-ESIA-PE-Book 2 and in Sections 10.1, 10.5 and 10.7 of this report.

10.12.4 Results of the cumulative impact assessment

The characteristics of cumulative impacts on the components of the social environment are given in Table 10.12.1 (Table 10.12.1).

It was found that the cumulative impact of the planned activity on the labour market at both stages is assessed as moderate. Residual impacts are also assessed as moderate, which is associated with changes in the way of life and quality of life of communities on a long-term basis, and a decrease in unemployment.

The environmental and social policy of the project creates the basis for the implementation of subsequent plans of the enterprise for the priority employment of the working population of Jizzakh city and the Sharaf-Rashidov district. It is expected that all combined cycle power plant development projects will be implemented taking into account mitigation measures.

The cumulative impact on transport infrastructure is associated with an increase in traffic intensity and the volume of freight transport. Residual impacts on transport infrastructure are assessed as moderate. Mitigation of the consequences associated with the impact on traffic and road infrastructure is ensured by the preparation and implementation of a Traffic Management Plan (TMP), ensuring the smooth and safe movement of traffic along alternative routes.

The impact on social infrastructure is assessed as moderate, the residual impact as low.

In order to prevent negative consequences of cumulative impacts on the social infrastructure of the district, within the framework of the implementation of social and environmental policy, it is recommended to provide for:

- participation of the project in the shared development of infrastructure of the Sharaf-Rashidov district;
- development and implementation of social assistance programs for vulnerable groups of the population.

Table 10.12.1 Matrix of results of the assessment of cumulative impacts on the social environment

Life cycle stage: construction

Recipient: able-bodied population

Recipient sensitivity: medium

Characteristics of impacts

Impact	Impact on the labor market		**Orientation**	**Genesis**	**Mechanism**
			Positive	Direct	Cumulative
Primary impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Short-term	Reversible	Medium	Moderate
Consequences	None				
Measures	• To develop and implement a personnel policy that will further extend to the enterprise and ensure compliance with the requirements of the IFC and ILO PS-2 • Development, implementation and introduction of social and environmental policies of the enterprise				
Residual impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Short-term	Reversible	Medium	Moderate

Life cycle stage: construction

Recipient: transport infrastructure

Recipient sensitivity: high

Characteristics of impacts

Impact	Impacts on access to infrastructure		**Orientation**	**Genesis**	**Mechanism**
			Negative	Direct	Cumulative
Primary impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Short-term	Reversible	Medium	Moderate
Consequences	• Impacts on road infrastructure and traffic				

Measures	• Preparation and implementation of the Traffic Management Plan (TMP) • Ensuring unhindered and safe movement of traffic through detours or temporary access roads (if necessary) • Proper road signs, lighting, well thought out road safety signs, barriers and flaggers to control traffic				
Residual impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Short-term	Reversible	Small	Moderate

Life cycle stage: operation

Recipient: able-bodied population

Recipient sensitivity: medium

Characteristics of impacts

Impact	Impact on the labor market		**Orientation**	**Genesis**	**Mechanism**
			Positive	Direct	Cumulative
Primary impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Long-term	Reversible	Medium	Moderate
Consequences	None				
Measures	• To develop and implement a personnel policy that will further extend to the enterprise and ensure compliance with the requirements of the IFC and ILO PS-2 • Development, implementation and introduction of social and environmental policies of the enterprise				
Residual impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Long-term	Reversible	Medium	Moderate

Life cycle stage: operation

Recipient: population

Recipient sensitivity: medium

Characteristics of impacts

Impact	Access to social infrastructure	**Orientation**	**Genesis**	**Mechanism**
		Negative	Indirect	Cumulative

Primary impact	Scale	Duration	Reversibility	Magnitude	Significance
	Local	Long-term	Reversible	Medium	Moderate
Consequences	The increase in the burden on social infrastructure facilities				

Activities	• Participation of the enterprise in shared development of infrastructure of the Sharaf-Rashidov district • Development and implementation of social assistance programs for vulnerable groups				
Residual impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Long-term	Reversible	Small	Low

Life cycle stage: operation

Recipient: transport infrastructure

Recipient sensitivity: high

Characteristics of impacts

Impact	Impacts on access to infrastructure		**Orientation**	**Genesis**	**Mechanism**
			Negative	Direct	Cumulative
Primary impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Long-term	Reversible	Medium	High
Consequences	• Impacts on road infrastructure and traffic				
Measures	• Preparation and implementation of the Traffic Management Plan (TMP) • Preparation and implementation of optimal logistics schemes				
Residual impact	**Scale**	**Duration**	**Reversibility**	**Magnitude**	**Significance**
	Local	Long-term	Reversible	Small	Moderate

13
CONCLUSIONS

The environmental and social impact assessment for the project “Construction of a combined-cycle power plant with a capacity of 550 MW” was carried out in accordance with national requirements and applicable requirements of the International Finance Corporation for attracting project financing.

The work within the framework of the integrated ESIA of the project was carried out by the company “Encompass”.

The results of the impact assessment of the combined-cycle power plant construction project on the environment and social environment indicate the fundamental possibility and admissibility of implementing the planned activity, taking into account the implementation of the proposed measures and recommendations for monitoring.

1. Possible alternatives to the implementation of technical solutions (including the location of the facility, the choice of technologies and /or others) do not have fundamental differences in terms of environmental impact. There are no grounds for abandoning the planned activity.
2. Based on the totality of the considered technical characteristics of the main (electricity production) and auxiliary (water supply, wastewater treatment, organization of recycling cycles) equipment of the project, it can be concluded that the planned activity, in general, complies with the requirements of EU BAT.
3. As a result of the studies, the characteristics of the expected impacts of the planned activity on the natural and social environment have been determined, which are characterized mainly by medium or moderate significance, local scale.
4. An overview of the results of the impact assessment of the planned activities for the construction and operation stages of the project is presented in Table 13.1.1.

Table 13.1.1 Results of the assessment of the impact of planned activities on the environment and social environments

Item	Impacts	Stage	Orientation	Scale	Significance 58
1.	IMPACT ON ATMOSPHERIC AIR QUALITY	C	–	Local	Negligible
		E	–	Domestic	Low
2.	Impacts related to GHG emissions	E	–	Regional	Low
3.	Acoustic and vibration effects	C	–	Local	Negligible
		E	–	Local	Low
4.	Impacts associated with waste generation	C	–	Local	Negligible
		E	–	Domestic	Low
5.	Impact on surface waters	C	–	Domestic	Low
		E	–	Domestic	Low
6.	Impact on underground water	C	–	Local	Low
		E	–	Local	Low
7.	Impact on soil cover	C	–	Local	Low
		E	–	Local	Negligible
8.	Impact on the flora	C	–	Local	Negligible
		E	–	Local	Negligible
9.	Impact on terrestrial wildlife	C	–	Local	Low
		E	–	Domestic	Low
10.	Impact on the ichthyofauna	C	–	Domestic	Low
		E	–	Domestic	Low
11.	Effects on organisms of aquatic ecosystems	C	–	Domestic	Low
		E	–	Domestic	Low
12.	Impact on the labor market	C	+	Regional	Moderate
		E	+	Domestic	Moderate
13.	Impact on economic development	C	+	Domestic	Moderate
		E	+	Regional	Moderate
14.	Impact related to training, professional development	E	+	Domestic	Moderate
15.	Land acquisition, economic relocation	C	–	Domestic	Low
16.	Labor influx and population change	C	–	Domestic	Low
		E	–	Domestic	Low
17.	Child and forced labor	C	–	Domestic	Low
		E	–	Domestic	Low
18.	Impact on access to transport infrastructure	C	–	Domestic	Low
		E	–	Domestic	Low
19.	Supply chain impacts	C	–	Regional	Low
		E	–	Regional	Low
20.	Impact on cultural heritage	C	–	Local	Negligible
21.	Impacts on workers' rights, safety and labor protection	C	–	Local	Negligible
		E	–	Local	Low
22.	Impacts on public health, safety and welfare	C	–	Domestic	Negligible
		E	–	Domestic	Low
23.	Cumulative impacts	C	–	Domestic	Moderate
		E	–	Domestic	Moderate

54 The significance of residual effects is given (assessment after the implementation of recommended measures, if applicable).

5. The project for the construction of a combined-cycle power plant belongs to category A according to the requirements of the IFC:
   - the project has the potential to cause significant negative impacts on the environment and social conditions;
   - the project's area of influence includes the territories adjacent to the project;
   - the implementation of the project will require the implementation of various measures to prevent and/or minimize negative environmental and social impacts.
6. The majority of greenhouse gases are produced by the use of natural gas in production processes and energy generation.
7. Air pollution in the residential area does not exceed permissible levels for any indicator; the impact of the power plant is acceptable.
8. It has been established that the cumulative impact of the planned activity on the atmospheric air is assessed as high. The residual impacts are also assessed as high, which is due to their inevitable transboundary nature, determined by the particular location of the ENTERPRISE on the border with the Republic of Tajikistan. The project of the SPZ of the ENTERPRISE developed by the Consultant, taking into account the commissioning of the ENTERPRISE, should create the basis for assessing the subsequent plans of the enterprise. It is assumed that all development projects of the plant will be carried out taking into account measures to mitigate the consequences.
9. Cumulative impacts on the social environment are also predicted – impacts on employment and the local economy, impacts on infrastructure. The implementation of the Project will have a positive impact at the local level through the creation of jobs, the purchase of goods and services by workers during the construction phase and the improvement of the infrastructure of the Sharaf-Rashidov district. During the operational phase, positive impacts are expected at the national level (increase in the country's gross domestic product, increase in government revenues and taxes). Given that most socio-economic adverse impacts are assessed as moderate or low, the project has a limited contribution to the cumulative adverse impacts.
10. The results of the impact assessment provided the basis for developing measures to prevent/reduce their level. The justification of the measures is carried out in accordance with the hierarchy recommended by IFC Performance Standard 1: avoid impacts, minimize impacts, restore affected components/ecosystems/communities (if applicable), compensate affected components/ecosystems/communities (if applicable). Particular attention is paid to impacts whose significance is assessed as "High", but measures for other impacts are also considered.
11. The environmental protection solutions proposed in the ESIA include:
    - a set of measures to protect atmospheric air;

- prevention of waste generation and/or reduction of waste generation volumes;
- measures to reduce water consumption (use of drainage water in the production cycle).

12. Solutions to ensure a favorable living environment for the population include:
    - organization of a sanitary protection zone;
    - measures regarding the acoustic environment, which provide for a set of planning, organizational and technical solutions to reduce the level of noise impact.
13. As a result of the assessment, a set of measures in the area of social responsibility, interaction with stakeholders, working conditions, health and safety of personnel and the population was substantiated, including:
    - adoption of the Personnel Policy;
    - elimination of child and forced labor;
    - training and professional development of personnel;
    - Traffic Management Plan
    - creation of an effective grievance mechanism.
14. Based on the results of the ESIA, an Environmental and Social Action Plan (ESAP) will be prepared. The plan sets out the activities and management measures to ensure that the project complies with national requirements and applicable IFC requirements.
15. The effectiveness (efficiency) of the implementation of the proposed measures is determined as a result of monitoring the state of environmental components and/or its individual indicators (atmospheric air, surface and ground water, soils, acoustic environment), as well as social aspects.
16. ESAP is an important part of the loan agreement; the implementation of the Plan's measures is monitored during the project implementation monitoring.
17. The environmental and related socio-economic consequences of the planned activity are assessed as acceptable, provided that the recommendations substantiated by the ESIA study materials are fully implemented.
18. As part of the ESIA, Stakeholder Engagement Plan (SEP) was prepared. The SEP provides for continuous engagement with stakeholders throughout the project life cycle.
19. Activities include consultations with community representatives, disclosure of information to local communities at key project milestones such as construction start and end, regular updates on the website and social media, updating of the SEP and annual project reporting.
20. Preliminary results of public information have shown the absence of public concerns and public preferences that require consideration when the customer makes decisions regarding the planned activity. The information and discussion processes continue.