ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

St. George Solar PV Project (Phase I and II) - Bulgaria

Report details:

Project name	**ST. GEORGE SOLAR PV PROJECT (Phase I and II)**
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5.2	09 September 2024	Final ESIA (with minor social updates to explain social methodology)	AON	N Davies	D Jackson

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Acronyms and Abbreviations

Name	Description
AoI	Area of Influence
CBO	Community Based Organizations
CLO	Community Liaison Officer
EHSS	Environmental, Health & Safety and Social
EIA	Environmental Impact Assessment
EPA	Environment Protection Authority
EPC	Engineering, Procurement and Construction
E&S	Environmental and Social
ESAP	Environmental and Social Action Plan
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESMS	Environmental and Social Management System
ESP	Environmental and Social Policy
ESDD	Environmental and Social Due Diligence
EU	European Union
HUB	Hub substation
GBVH	Gender-Based Violence and Harassment
GIIP	Good International Industry Practice
GM	Grievance mechanism
IFC	International Finance Corporation
KPI	Key Performance Indicator
LCOE	Levelized Cost Of Electricity
NTS	Non-technical Summary
O&M	Operations and maintenance
OHSP	Occupational Health and Safety Plan
OESMP	Operational Environmental Management Plan
OESMS	Operational Environmental Social Management System
OHTL	Overhead Line
PDA	Project Development Area
PR	Performance Requirement
PS	Performance Standard
PV	Photovoltaic
SCADA	Supervisory Control and Data Acquisition
SCBIM AON	Societatea de Cercetare a Biodiversitatii si Ingineria Mediului AON
SEP	Stakeholder Engagement Plan
SPV	Special Purpose Vehicle
SUS	Step-up Substation
TTMP	Temporary Traffic Management Planner

1. INTRODUCTION

1.1. Project background and overview

The PV Project consists of the following components which will be described in more detail in Section 2.0:

- PV Plant Phase I
- PV Plant Phase II
- Step-up Substation (SUS) - one substation with two step-up transformers
- Hub substation - located near the village of Smilets (HUB) [1]
- Low Voltage (LV) cables and LV/MV power stations and transformers.

The OHTL Project includes:

- 3.7km 110 kV double circuit OHTL "Pelikan" connecting to existing 110 kV OHTL "Silistra to Tutrakan" via "loop in loop out" "LILO" connection (approximately 20 towers).
- 2.3km 110 kV double circuit OHTL "Dorostol" connecting to existing 110 kV OHTL "Silistra to Dorostol" via "LILO connection (approximately 11 towers).

The total areas within the fence line for the PV site and substation is 1,642,344 m^2. Both the PV Project and OHTL works will have supporting infrastructure (e.g. offices and welfare facilities, security system, fencing, drainage, and internal road networks). The OHTL Project will establish a temporary laydown area in the vicinity of the Project (location to be confirmed).

The PV project will be developed in accordance with national standards and the International Finance Corporation (IFC) Performance Standards (2012) as outlined in section 4.0. .

1.2. Objectives of the ESIA

The main objectives of this ESIA are as follows:

- Confirm the baseline conditions (existing conditions) before the development of the project through a review of available data and conducting surveys;
- Assess the project's environmental and social (E&S[2]) impacts for all the phases of the project against Project requirements (national and Lender);
- Provide an overview of the Project design, identification of sensitive receptors in the Project's area of influence and assessment of Project alternatives;
- Review of compliance obligations, including applicable national regulations, as well as international lender requirements;
- To engage with key stakeholders and project-affected people (PAPs) to disclose Project information, study outcomes, gain local knowledge about the local E&S context and seek feedback on the Project;

[1] Developed by the Electricity System Operator (ESO)

[2] E&S includes health, safety, environment, social, security and labour

- Determination of applicable mitigation and management measures to be implemented to avoid or minimise potential impacts following good international industry practice (GIIP) and Lender standards;
- Consider alternatives for social and environmental gains.

This ESIA provides an over-arching assessment of the E&S impacts of the Project. It is intended to provide project developers and Lenders with enough information on the site, the project's potential impacts and mitigation measures to address any adverse risks and maximise environmental and social opportunities.

To finance the Project, Lenders require the Company to comply with all applicable Bulgarian laws and regulations and international environmental and social standards and guidelines, such as those of IFC or other relevant International Financing Institutions (IFI's). In addition, the ESIA is prepared following IFC Performance Standards (PSs) and World Bank Group (WBG) Environmental, Health and Safety (EHS) Guidelines. This approach ensures that the Project is carried out responsibly from an ecological perspective and complies with international requirements and standards.

1.3. ESIA Approach

The approach to the development of the ESIA has been to identify and assess the direct and indirect significant impacts of the Project. Risks and impacts associated with the Project have been considered where they are likely to affect:

- the local population and human health;
- on land, soil, water, air and climate;
- on landscape;
- on biodiversity;
- on cultural heritage.

The ESIA assesses these impacts separately and identifies how they interact. Furthermore, it identifies risks and suggests mitigation measures where appropriate.

1.4. Project proponent and Key Entities

Different entities are involved in the planning and implementation of the Project. The responsibilities of key entities relevant to the Project are listed below, along with a general description of their roles[3]:

- **Rezolv Energy:** *the developer of the Project before the establishment of the Project Company, and they are a shareholder in the Project Company. They will be overseeing E&S compliance and reviewing reports to be submitted to Lenders.*

- **R-Engineering EOOD** *(the Project Company): is the entity responsible for the development of the Project and is the owner of the Project and will be the entity signing*

[3] Further information on the roles and responsibilities of these parties can be found in the Project Environmental and Social Management Plan (ESMP).

the loan agreement with the Lenders and overseeing the implementation of E&S requirements as defined here.

- **Elektroenergien Sistemen Operator"/"Electricity System Operator *EAD ("ESO"):*** *ESO is an independent transmission operator responsible for the everyday operational planning, coordination and control of the Bulgarian power system and its parallel synchronous operation with neighbouring systems. Its remit includes transmission grid operation, maintenance and reliable functioning, auxiliary network servicing, and maintenance and repair services in the energy sector. It also manages the power transit through the national grid and runs the electricity market. The country's electricity transmission network is divided into 13 network operating districts.*
- **Engineering Procurement and Construction (EPC) Contractor (or Contractor)***: is responsible for preparing the detailed design and layout of the Project; supply of the material and equipment (PV Panels, inverters, etc.); construction of the Project and its various components (PV Panels, internal roads, building infrastructure, etc.).*
- **Subcontractors***: Subcontractors are identified as any entity (international or local) appointed directly by the Contractor through contractual arrangements to undertake construction activities within the Project area or provide a specific service for the Project.*
- **ESIA Consultant (SCBIM AON)***: hereafter referred to as the 'ESIA Team' who is the ESIA Practitioner, and the consultant commissioned by the Developer to prepare the ESIA for the Project.*
- **Lender Environmental and Social Advisor (LESA):** *Is assigned by the Lender(s) to provide different services, including E&S due diligence of the Project before financial close, supervision and monitoring of the construction and operational phases.*
- **Operation and Maintenance (O&M) Contractor** *(or referred to as Project Operator): will be responsible for the daily operation of the Project and undertaking all maintenance activities required for the project.*
- **Ministry of Environment and Water of the Republic of Bulgaria (MEW):** *the Regulator and the official governmental entity responsible for protecting the environment in Bulgaria.*
- ***R*egional Inspectorate of Environment and Water Ruse (RIEW)***: the regional entity responsible for the approval of projects in terms of environmental protection;*

1.5. Project permitting overview

At this time, valid construction permits are issued for the following:

- PV plant East (Construction Permit No 10 dated 09.02.2022)
- PV plant West (Construction Permit No 50 dated 26.05.2022)
- Step-up transformer station (Construction Permit No. 14 dated 18 February 2011)
- 110kV OHTL "Dorostol" (Construction Permit Dated 27 January 2022)

- 110kV OHTL "Pelikan" (Construction Permit) [4]

RIEW concluded that for the following project elements, a national environmental impact assessment (EIA)[5] is not required to be issued. Confirmation of this is provided in the following resolutions, available as separate documents:

- PV Plant Phase I - Decision No 7 of RIEW confirming no EIA required, dated 27.01.2022
- PV Plant Phase II - Decision No 46 of RIEW confirming no EIA required, dated 26.04.2022
- Substation area& Pelikan OHLT - Decision №РУ-91-ПР-2022 of RIEW confirming no EIA required, dated 07.09.2022
- Cable line Dorostol - Decision 102 of RIEW confirming no EIA required, dated 30.09.2022.

Separate zoning and construction permits were issued for the two PV power plants, but they are to be connected to the grid as a single-generation module under the Connection Agreement. There is a valid contract for the grid connection of the PV plants. All requirements by the Grid operator will be implemented in the approved design.

Vegetation clearance works and some building removal commenced in February 2023, as a pre-condition of the acquisition before the Project Company's site acquisition. Further information is provided in section 6.1.

1.6. ESIA structure and schedule

To comply with the requirements for environmental and social assessment established by international good practice, this report is presented in the following format:

- Volume 1: Non-Technical Summary (NTS).
- Volume 2: ESIA includes main text, tables, and figures (ESIA) and scoping summary (Annex 1) (this report)
- Volume 3: Supporting Appendices
    - I- Biodiversity baseline
    - II -Noise baseline and modelling (construction and operation) (Decibel)
    - III - Socio-economic survey and questionnaires (blanks)
    - IV - Environmental and Social Management Plan (ESMP),
    - V - Stakeholder Engagement Plan (SEP), including grievance mechanism.

Volume 2 comprises the main text of the ESIA and full impact assessment, with mitigation, management and monitoring measures identified. Volume 2 aligns with the following chapter structure:

1. Introduction
2. Project description
3. Analysis of alternatives

[4] Drafting note: to be completed

[5] Further elaboration on the national requirement is provided in Chapter 4.

4. Regulatory and policy framework
5. ESIA approach and methodology
6. Baseline characterisation

Impact Assessment Chapters

7. Biodiversity
8. Soil & groundwater
9. Wastewater drainage and water quality
10. Solid waste management
11. Archaeology and cultural heritage
12. Air quality
13. Traffic and Transportation
14. Environmental noise
15. Land use
16. Social
17. Occupational health and safety
18. Labour
19. Environmental and Social Management Plan (Overview)
20. Conclusions
21. References

Annex 1 – Scoping Table

1.7. Project Schedule

Table 1 summarises the key achieved or proposed milestones for the ESIA and the Project.

Table 1: Project ESIA and Development Schedule (phase 1 and phase 2)

Activity	Date
Scoping	October 2023 *(completed)*
Consultation on national EIA screening submission	2009 to 2022 *(completed)*
Finalisation of draft ESIA	January 2024 (completed)
Consultation on draft ESIA	February 2024 (completed)
Lender disclosure period	April 2024 to May 2024 (completed)
Construction Start	August 2024
Commissioning	January to July 2025
Commercial Operation Date	October 2025
Expected Lifetime	25 years (2025 to 2050)

1.8. ESIA team and contact information

SOCIETATEA DE CERCETARE A BIODIVERSITATII SI INGINERIA MEDIULUI AON (SCBIM AON) was contracted by Project Company to prepare the ESIA for the Project. The team who worked at this study are presented in Table 2.

Table 2: ESIA Team

Ref.	Name and Position
1.	Eng. Petrescu Traian – coordinator, environmental expert
2.	Eng. Petrescu Traian-Razvan – deputy coordinator, environmental specialist
3.	Ecologist PhD. Vasile Daniela – environmental expert, expert in natural protected areas, avifauna specialist
4.	Biologist Florea Nicolae
5.	Ecologist Ciucardel Gabriel
6.	Ecologist Zanfir Dan-Alexandru
7.	Biologist Fuiorea Alexandra
8.	Biologist Krasimir Kirov
9.	Florea Cristian Florin
10.	Eng. Petrescu Antonia-Irina
11.	Eng. Pereni Raluca-Maria
12.	Dragomir Ioana Letitia - legal assessment
13.	Asst. PhD. Andreea Pene - Sociologist Expert - collaborator

2. PROJECT DESCRIPTION

2.1. Needs Case

Bulgaria has been especially exposed to the energy crisis as the country's energy mix relies heavily on fossil fuels, particularly coal for electricity generation, and crude oil products for transportation. With a high dependence on Russian oil and gas imports, Bulgaria met a staggering increase in gas, power and fuel prices, intensifying both the social and political instability.

Given the global nature of the processes of climate change, the policy of Bulgaria in the area is determined by the international commitments undertaken by the country's ratification of the UN Framework Convention on Climate Change and the Kyoto Protocol on one hand and the other – by the European legislation in this area.

On 22nd of April 2016, 175 countries, including Bulgaria, signed the Paris Climate Agreement, which undoubtedly marks a historic breakthrough – after many years of negotiations, the countries concluded that the only response is the shared actions to reduce greenhouse gas emissions, setting a global goal of limiting global warming to 2 degrees Celsius and a vision for the ambitious target of 1.5 degrees.

The Ministry of Environment and Water conducts the overall state policy on climate change mitigation, assisted by the National Expert Committee on Climate Change as an advisory body. For the purpose of application and implementation of the country's commitments under international, European and national legislation on climate change, Directorate Policy on Climate Change is structured within the Ministry.

Bulgaria actively participates in the global efforts to mitigate climate change and adapt to the changes that already have taken place. Since 2014 the Climate Change Limitation Act is active. The Third National Action Plan on Climate Change is being implemented and the preparation of a national adaptation strategy is underway. Bulgaria participates successfully in the European trading scheme for greenhouse gas emissions with 127 installations throughout the country. Along with the other member states of the European Union, Bulgaria will fulfil a common goal to reduce greenhouse gas emissions with at least 40 % by 2030 with the adoption of the policy framework on climate and energy by 2030.

As part of the ambitious EU target of 32% share for renewables, Bulgaria is updating its policy to promote investments. In Bulgaria, the PV installed capacity is targeted to triple by 2030. In recent years the annual growth of the solar sector has been 40% year on year[6]. Solar PV will drive the renewable energy sector (RES), projected to grow to 27% of gross energy consumption by 2030.

[6] Bulgarian Photovoltaic Association

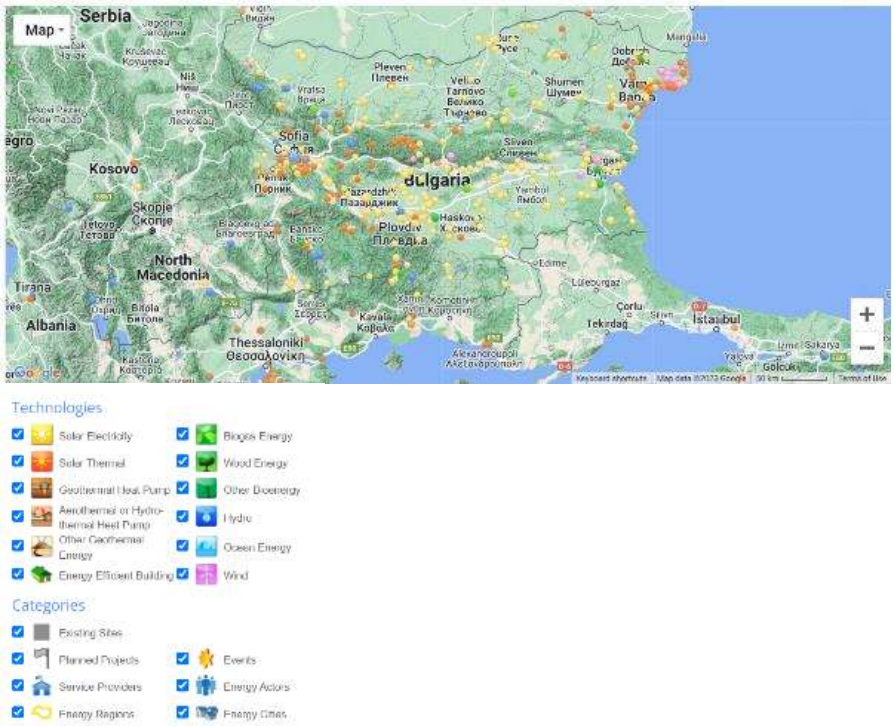


Figure 1: Renewable energy projects in Bulgaria
(Source RePowerMap)

This investment is therefore of particular importance for the fulfilment of Bulgaria's RES policy objectives as part of its obligations under Directive 77/2001/EC, part of the EU accession agreement.

This investment also contributes to providing energy independence at national, local and individual levels. Because of this, it has a direct and positive effect on Europe`s energy independence and security of supply. Energy independence is becoming a factor of growing importance for economic stability and political security.

Furthermore, the growing RES sector and Solar PV industry attracts investors to Bulgaria due to the country’s:

- favourable conditions and location
- low tax rates
- low land prices
- favourable policies and legislation.

2.2. Project location

The Project location is shown in Figure 2 below.

Figure 2. Project Location (source: Employers requirements, Mott MacDonald)

The PV Project site ("PV Site") is on a former airbase, decommissioned in December 1999. The site is located in northeast Bulgaria, in the village of P. Lambrinovo (P-Lambrinovo), 5 km south of Silistra in the Silistra District. The airfield began operations in 1970, servicing domestic and international passenger and cargo flights, and ceased operations in December 1999. It includes a disused reception building, an approximately 2.5 km runway, and previously had areas allocated for garaging military aircraft and ammunition stores, which have since been removed. According to local knowledge, the airport has never been used for military purposes.

The OHTL Projects route over agricultural land to the north and east of the PV Site to connect into two separate but existing overhead lines. The start of these lines is also depicted in Figure 3.

Figure 3: PV Project Boundary (map shows cleared areas)

2.3. Project receptors

A receptor is an entity that may be affected by direct or indirect changes to a social or environmental variable. The area of influence (AOI) is defined by where receptors may feel or observe Project impacts, e.g., the zone of visual impact or the distance from the working area where noise or air quality impacts may be identified. AOI can defined in two ways;

- indirect AOI area - where secondary or induced benefits or effects may be realized, including employment impacts or impacts from an influx of workers.
- direct AOI - varies depending on the specific environmental or social aspect considered based on the extent an impact may be affected and can be influenced on a spatial and temporal level.

For the scoping exercise (see Annex A), an initial AOI of 50 km from the Project site has been defined considering the potential avifauna risks with the nearby protected area and potential impacts and benefits on the broader communities for the identification of Project receptors.

For the ESIA, topic-specific direct and indirect AOI are described in the individual impact assessment sections below (including the social AOI). The topic specific AOI have been informed by GIIP, the outcomes of the scoping and the ESIA baseline data collection process.

Generally, for the solar panels, the distance from the module structure to the site boundary is 5 m and 10 m to the nearest inverter. The nearest residential receptors in P. Lambrinovo are approximately 15 m from the nearest PV panel and 19 m from the nearest inverter.

Figure 4: Location of the Project boundary relative to the neighbouring properties

2.4. Project Layout (PV panel layout)

The PV Site layout, as depicted in Figure 5 below. It includes the main area to the west of highlway 218 and a small area to the east of Highway 218 There are no regulatory setback requirements between the solar panels and the boundary of the site or neighboring residential receptors.

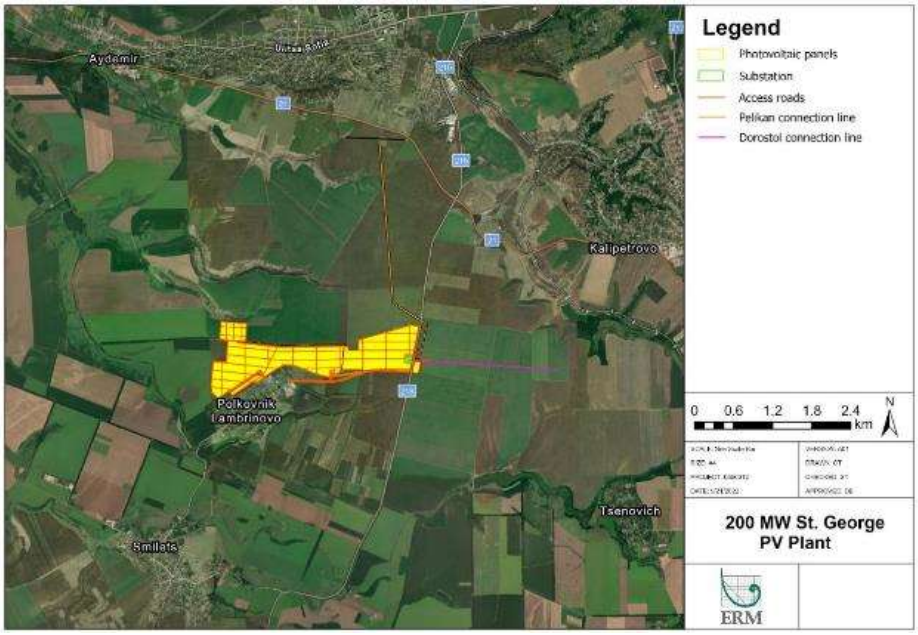


Figure 5: Project Site Layout

Figure 6: St. George East Site Layout (phase 1)

Figure 7: St. George West Site Layout (phase 2)

2.5. PV Project components

The PV power plant, referred to as the "Project," has been divided into two “phases” or subprojects, namely St. George East and St. George West, reflecting various technical options for its development. This division entails the construction of a PV plant (East & West), each with its own set of components including step-up transformers and overhead lines (OHLs), to be implemented either concurrently across relevant areas of the Project Plots or separately based on project needs and timelines. As outlined in the table below, the Maximum AC Capacity (MW at power factor 1) is calculated as the aggregate AC power output of the inverters.

Table 3: Plant and subsites total installed DC and Maximum AC Capacity.

Subsite	Installed Capacity (MWp)	Maximum AC Capacity (MW)
St. George East	114.55	99.5
St. George West	114.55	99.5
Overall Plant	**229.10**	**199.0**

Each of the following project components is discussed in turn below:

- PV modules
- Low Voltage (LV) cables and LV/MV power stations and transformers.
- Control system
- Internal roads
- Water Supply and Treatment
- Interconnection
    - Step-up Substation (SUS) - one substation with two step-up transformers

- Hub substation - located in the village of Smilets (HUB) [7]
- The 110 kV double circuit Overhead Line (OHTL) "Pelikan", spans 3.7 km connecting to existing 110 kV OHTL "Silistra to Tutrakan" via "loop in loop out" "LILO" connection
- The 110 kV double circuit OHTL "Dorostol", spans 2.3 km connecting to existing 110 kV OHTL"Silisatran to Dorostol" via "LILO connection.

- Supporting infrastructure and activities (e.g. office and welfare facilities, security system, fencing, drainage, internal road network, accommodation, construction).

2.5.1. PV Modules: Phase I – 100 MW and Phase II – 99MW

The PV modules shall be bifacial crystalline silicon to be supplied by the supplier determined by the Contractor from the project company's approved supplier list. The PV module will have a rated capacity of 580 Wp and electrical characteristics that allow 25 modules serial in one string. The total number of modules is expected to be approximately 395,000. The buffer zone between the fence line and the PV panels is expected to be five meters.

The PV Project building permit design envisages 580Wp south-facing modules on fixed structures with string inverters. A 0.8kV/33kV transformer stations will evacuate power from the PV Plant to the grid connection facilities.

Modules will be mounted on an aluminium framed mounting structure (frame size 1134 x 2278 mm) orientated horizontally (5 modules in landscape orientation) approximately 0.6 m above ground level. The PV modules will be mounted and earthed following the PV module manufacturer's installation manual.

The structure of the trackers will be installed employing direct driving techniques to the ground whenever possible to a minimum depth determined by the geotechnical studies. Only if direct driving is not possible will a pre-drilling method be used. The expected foundation depth will be 1.5 to 2 meters.

To inject the DC generated by the modules into the electrical grid, it is necessary to transform it into an AC of similar conditions to that of the grid. Inverters convert the DC electricity produced by PV arrays into AC electricity compatible with utility grids. In addition, PV inverters often provide system protection and data communications. Utility-scale string inverters (1500 V max Voc) will be installed on the aluminium frames hung on the mounting structures. The inverters will be installed and routed to low to medium-voltage transformers. An example of a typical inverter is provided in Figure 8. It is possible to place 1 x 1 m noise barrier in front of at least the closest seven inverters to the southern boundary of the site.[8]

[7] Developed by the Electricity System Operator (ESO)

[8] Following completion of the noise modelling additional noise barriers can be installed as necessary.

Figure 8: Example of a typical string inverter

2.5.2. Cables

Most low-voltage DC cable routes will run above the ground on the PV mounting structures, and AC cable runs from string inverters to LV/MV (0.8/33kV) substations. Where string cables must travel between rows, the cable should be buried in ducting. Where ducts are installed, they must be sealed with rodent and waterproof filling material at both ends. Where string cables must travel from one mounting structure to an adjacent one within the row, the cables should be adequately shaded from direct sunlight (e.g. UV, rated conduit, which can be cut along to avoid pulling cables through conduits). Trenches shall be backfilled with clean fill material free from aggregate, debris, organic material and stones.

An MV (33kV) underground cable will run from LV/MV substations to step-up transformers (33/110 kV). The MV cables will run in trenches (directly buried or under a tube, depending on the section) at a depth to meet the applicable Bulgarian standards and GIIP. Underground cables will be laid on a clean layer of sand, always covered with warning tape. Mechanical protection shall be provided and installed for LV and MV trenches. Backfilling materials shall be free of rocks, vegetation or any element that could damage the cables or create cavities after compaction. Bedding material should be tested and aligned with the cable sizing calculations' electrical and thermal resistivity assumptions. All LV/MV transformers and cabling will be accessible by internal road for operation and maintenance of the PV Project.

2.5.3. Control System

The PV Plant's monitoring and control system will be based on open products on the market and will include the SCADA and the Plant's control system, as well as all the necessary equipment to communicate with the rest of the Facility's systems.

2.5.4. Internal roads

Internal roads will be constructed as needed to provide access to inverters, transformers, permanent buildings, and any other relevant equipment by its dimensions deployed within the PV Sites. Where possible, most of the internal roads will utilize the existing asphalt surfaces (including the apron runway); however, some of the LV/MV substations require newly constructed gravel roads.

In the areas of the PV site where no roads are included, the layout shall consider sufficient space for the circulation of vehicles to reach any equipment where recurrent maintenance needs may be expected. Paths at least 3 meters wide, free of obstacles, will be placed to allow maintenance work to be performed safely.

2.5.5. Water supply and treatment

The Project will have a robotic dry-cleaning system (RCS) based on the final selected PV module. The RCS will be fully automated with no requirements for any labour during operation and will be operated by the auxiliary power generation unit. The RCS will not require any water consumption during operation. However, there may be occasional water usage for quarterly cleaning of the RCS equipment. Failure to conduct this cleaning will lead to degraded plant performance. The cleaning process itself will require an estimated annual water usage of approximately 15 m^3. For wet cleaning, small amounts of water per PV module is required. The whole process is not expected to use additives that might alter the water quality. Nevertheless, in case of usage, it must be biodegradable with low environmental impact, contain no volatile organic compounds (VOCs) phosphate and be chlorine-free.

During construction water for the construction process approximately 15000 m^3 of water is required. The water will be obtained from the existing water pipeline that runs close the Project site.

During operation, the step-up substation (SUS) facilities will have a permanent drinking water supply connection from the municipal water pipeline, which crosses the site and will be used for the operation of the PV Project as well. It is envisaged to utilize this permitted connection also as construction water supply. No sewerage system connection is available, so the wastewater from the step-up substation will be drained into a septic tank in permanent operation and temporary facilities for removal to an offsite wastewater treatment plant (WWTP) during construction.
Construction water requirements are estimated as follows:

2.5.6. Associated Facilities

There are no Associated Facilities as defined by IFC PS1 related to the PV Project or the OHTLs.

2.6. Site access

Three possible access points are identified, including:

- Access option 1 - New access directly from R 218 (east of the site)
- Access option 2 - New access from South
- Access option 3 - New access from Southwest

The final option regarding the use of Access 3 is not determined at this time; however, the Project Company is committed to entirely avoiding the use of Access 3 as a backup access point in order to minimize impacts on the local village.

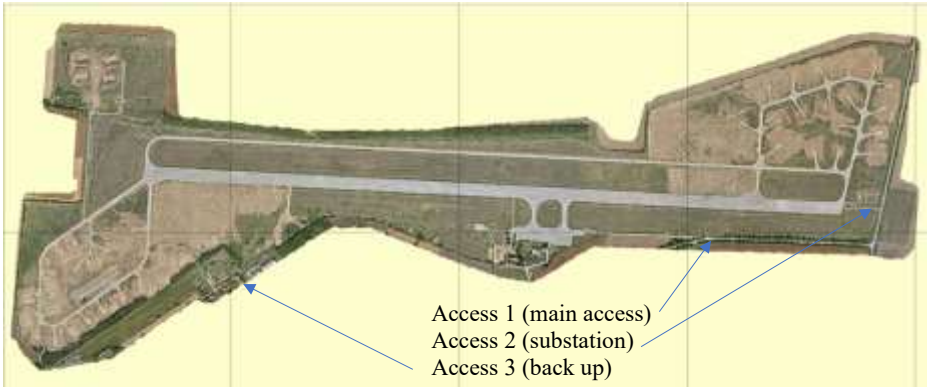


Figure 9: Alternative access options

2.7. Substation/grid connection

Figure 10 below shows the location of each of the Project subsites, the Step-up Substation (shown in the figure as *"Step-up Substation"* the Hub Substation "Smilets" and the double circuit lines leading to the interruption points with the existing OHLs "Pelikan" and "Dorostol.

Figure 10: St. George substation sites and PV substation and indicative routes of "Pelikan" and "Dorostol" 110kV OHTL interruption points

The grid connection facilities are located on the eastern part of the land plot and comprise the following:

- 110/33kV Step up substation (SUS), comprising two identical 99,5MVA substations. Power from the two step-up substations is exported to two separate bays of the Hub Substation switchyard, located on the east side of the SUS.
- 110kV Hub substation (HUB), located on the east side of the step-up substation, consisting of a dedicated building and an open switchyard, all the auxiliary equipment – power supply cabinets, UPS, relay protections, SCADA, etc. Principally, it is divided into two sections, each containing two circuits connected to the existing 110kV OHTLs, which will be interrupted, and each part will be dedicated to a specific substation after interruption. There is a coupler bay through which both sections can be interconnected if required.
    - Section 1
        - Connection of OHTL "Pelikan" towards "Tutrakan" substation
        - Connection of OHTL "Chapla" towards "Silistra" substation
        - Spare bay
        - Measurement bay for Section 1
        - Connection of power transformer from Step-up substation # 1
    - Section 2
        - Connection of OHTL "Bekas" towards "Silistra" substation
        - Connection of OHTL "Dorostol" towards "Dulovo" substation
        - Spare bay
        - Measurement bay for Section 2
        - Connection of power transformer from Step-up substation # 2
    - Bus coupler bay
- 110kV OHLs connect the Hub substation to the national grid. There are two double circuit power lines running towards two existing single circuit power lines (Dorostol and Pelikan) that are interrupted in order to make the connection to the new Hub Substation. Connection to "Dorostol" OHTL goes in east direction with an approximate length of 2.3km to the interruption point. Connection to "Pelikan" goes in north direction with approximate length of 3.7km to the interruption point.

St. George PV plant will be connected to the grid by splitting two existing power lines – "Pelikan" and "Dorostol". These connections result in 4 new power lines, which will connect to the Hub substation "Smilets" from east. The four lines will be installed on two double circuit lines up to the respective interruption points.

- OHTL 110 kV "Pelikan" towards substation Tutrakan;
- OHTL 110 kV "Chapla" towards substation Silistra;
- OHTL 110 kV "Bekas" towards substation Silistra;
- OHTL 110 kV "Dorostol" towards substation Dulovo.
-

2.8. Supporting infrastructure and activities - PV and OHTL Project

Supporting requirements and infrastructure for the PV site will include:

- Laydown area
- Wheel wash facility
- Water use
- New drainage system (site-wide)
- On-site buildings (operational control centre, office, welfare facilities, first aid facilities) are all located within the control room
- Diesel generator for emergency power supply (located adjacent to the central control room
- Emergency response (fire suppression, hydrants, water storage tanks) (site-wide)

Supporting infrastructure for the OHTL includes:

- Laydown area (outside the ROW)
- Tower Workfront (ROW) (including construction equipment, welfare facilities, emergency first aid points).

2.8.1. Temporary construction compound /welfare arrangements

A temporary compound with temporary offices and Project Site welfare facilities will be established before the commencement of the Works at the PV Project Site and for the OHTL works. The Contractor (s) will secure all necessary consents and permits for temporary offices and welfare facilities. The compound (s) will include all required services, including electricity supply, potable water and toilets and adequate firefighting and detection equipment. Foul water facilities will be of a type to ensure that no discharges are made or can find their way into local water courses or groundwater.

The Contractor is to secure a potable water supply and provide evidence that this supply complies with regulation No. 9 of 16.03.2001 on water efficiency, intended for drinking and household purposes, by appropriate testing. There will also be bottled water terminals and chemical toilets with water tanks available on-site during the construction of the PV plant.

The Contractor will also provide access to a clean kitchen/dining area, including potable water, bottled water, cooking, food storage and washing up facilities when on the Project Site. These facilities will be fully serviced and maintained by the Contractor regularly.

On completion of the Works, the Contractor will remove from the Project Site and other temporarily used areas all materials, construction machinery, equipment and temporary facilities, including all temporary services screens, fences, buildings, rubbish, unused materials, storage tanks, temporary power distribution lines, wooden crate, planks, plyboards/plywood used as packaging of equipment and all other temporary facilities.

2.8.2. Laydown area location

Most of the voluminous materials, like steel structures and frames, will be unloaded from the truck right at the entrance to the site, where is a large existing asphalted area can be used. Material will then be instantly distributed over the PV Site, where is temporarily stored (on locations next to the internal roads if possible) for a short period of time before it is used for installation. Other specific equipment's like inverters, eventually substations and other not voluminous, but valuable components will be unloaded at the entrance to site and temporarily stored on secured part of the existing asphalted area before it is used for construction. Components which will be used for the main step-up substation will be stored on the plot of step-up substation, eventually right next to it (on the plot of PV plant).

Generally, construction of OHTL does not require extensive temporary storage facilities, the target of Contractors is to plan the logistic in a way that most of the material is used right after it arrives to site. If required, a laydown area will be located within the PV Site boundary to support the works along the ROW.

2.8.3. Wheel wash facility

A suitably located temporary wheel wash facility will be constructed at the entrance of the PV Project Site. Routine cleaning of the roads to prevent silt/mud contamination of public roads from Project Site traffic must be performed by the Contractor when such contamination is present.

2.8.1. Concrete batching and aggregate sourcing

Concrete batching will be sourced from an existing offsite location, most likely in Silistra. Inputs include water, air, admixtures, sand, aggregate (rocks, gravel, etc.), fly ash, silica fume, slag, and cement.

2.8.2. Drainage

The Contractor will be responsible for the construction of all drainage systems to manage the surface water run-off as a result of the Works. The contractor shall make sure that no water runoff will flow from the PV Plant plot to SUS and Hub Station. The drainage provided will be consistent with the design assumptions and criteria of the other elements of the civil works, the environmental restrictions on the Works and the safety of personnel and wildlife through the duration of the construction works and the operation of the Works. The Contractor is required to maintain runoff water flow conditions in respect to the village P-Lambrinovo.

2.9. Installation – PV Project

The PV Project is developed in the following phases:

- Development (including assessment of technology and supplier options, contracting strategy, technical feasibility, E&S assessment, permitting and financing).
- Mobilisation (including detailed design, project implementation activities, local permit requirements, procurement and contracting).

- Construction (including site setup, clearance and excavations, construction and commissioning).
- Operation.
- Decommissioning.

Limited levelling is anticipated at the Site as the site has already been cleared, and some levelling has occurred. A cut-and-fill study will determine the area of levelling required, and further vegetation clearance will be limited to areas under active construction. It is not anticipated that the runway apron itself will be removed, but where possible it will become part of the internal access road.

Typical Project activities at each phase are presented below:

- Mobilisation:
  - transportation of civil construction materials to the site
  - storing of materials
  - recruitment of local workforce/services
  - identification of local materials.
- Site set up:
  - procurement
  - construction phase - civil works
  - secure site (fencing)
  - construct internal access roads.
- Site excavations:
  - foundation works (including delivery of cement) (the exact construction piling method is not confirmed at this time, will be confirmed once the geotechnical studies are completed).
  - cabling excavations
  - transportation of large loads materials to site (PV panels and transformers)
  - construction of operations building stores and maintenance yard
  - enabling work.
- Construction phase - mechanical and electrical works:
  - PV infrastructure installation
  - excavation for placement of tracking system
  - construction of substation
  - installation of substation equipment
  - LILO connection.
- Commissioning:
  - PV plant
  - Substation and OHTL.
- Operation:
  - operation of PV project
  - day to day maintenance
  - periodic / planned maintenance

  - monitoring.
- Decommissioning (construction):
  - reinstatement of excavated areas
  - removal of construction materials
  - rehabilitation of temporary storage and accommodation areas.

2.10. Installation -OHTL

The ROW acquisition process (as outlined in section 2.4 above) has been fully discharged in line with national requirements[9]. It is expected that all works connected with the OHTL construction and operation will take place within the ROW.

Before construction works commence, final decisions on structure types, foundation requirements, conductor size and type, insulation, line hardware, and bird protection devices will be determined following the feasibility study requirements and the outputs of this ESIA. The ROW and access routes will be surveyed, and the towers' OHTL centre line and locations will be marked (hereafter referred to as the tower work front). The tower footprint wil range from 3,0 m x 3,0 m to 7,2 m x 7,2 m. The sum for all towers footprint (intersection with ground level) is expected to be a maximum of 635.7 m^2.

Any required vegetation clearance will only be performed at the tower foundation locations, stringing positions and along access roads to the foundation sites from existing roads following the biodiversity mitigation requirements determined by the ESIA. An OHTL laydown area is expected to be earmarked within the existing land at the PV site.

Construction of the OHTL itself typically progresses sequentially by one or more teams (of approximately eight to fifteen workers) working along the whole OHTL or simultaneously on multiple sections of the OHTL route. The critical activities required at each work front are site clearance (rocks, vegetation), enabling works to establish vehicle access to each tower location, civil works (tower foundation works), steel delivery, steel erection, assembly and installation of the insulator, pilot wire installation, conductor stringing and then commissioning. Pre-mixed concrete will be delivered to the site in wagons, along with steelwork for the foundation frames and bases. Alternatively, pre-cast foundation blocks will be used, which will be manufactured outside the local area and delivered to the worksite. The tower is typically erected using a mobile crane, which lifts the assembled steelwork into position. Stringing the OHTL is generally performed by full tension stringing, which is performed by using a guy wire/pilot wire that is used to "pull" the conductor from the "conductor reel" at the start of the stringing point to another "pilot line winder reel" where the guide/pilot wire is collected. Pull sections incorporate, on average, about four towers.

2.11. Maintenance - PV

Routine maintenance on the PV equipment will be undertaken by the O&M contractor at least twice a year. Maintenance typically consists of a major maintenance period and a minor

[9] Supplementary livelihood restoration or compensation requirements for the OHTL route based on the requirements of PS5 are addressed in the livelihood restoration framework and any gaps will be closed before works commence.

maintenance period. The major maintenance is relatively non-intrusive and involves checking connections and inspections. This will encompass all PV equipment, including the fire system. Minor maintenance is typically a visual inspection and rectification of any accumulated noncritical defects.

During operation, all works on the Site will be controlled under safe work systems. This means all work is risk-assessed to protect personnel and equipment. Environmental and social requirements for the PV Plant operation will be managed following the operational environmental management plan (OESMP) and under an operational Environmental Social Management System (OESMS).

2.12. Maintenance - OHTL

The main works associated with the operation of the OHTL are maintenance of the ROW, tower and line inspections (including visual inspections) and tower and conductor preventative maintenance work. The network operator "ESO" will be responsible for this. Preventative maintenance works are typically scheduled when the line can be removed from operation (de-energised) to minimise health and safety risks from working on live equipment; however, maintenance work on live equipment cannot be ruled out and will be performed by highly specialised workers. There may also be a need for emergency works following an electrical fault or hardware failure resulting from missing bolts, lightning strikes, bird strikes etc. The network operator will organise and implement preventative and emergency maintenance works following their corporate maintenance schedules, maintenance guidelines and procedures, and training requirements.

2.13. Hazardous material storage and management (PV and OHTL)

Where hazardous material is either used by the Contractor (PV or OHTL) or discovered during the course of the Works (including during Project Site clearance), it is the Contractor's responsibility to deal with this in an appropriate manner. The treatment of hazardous materials will comply with any requirements as set out by the local/regional authority and landowner lease agreements. In reference to the transferring of hazardous waste to or from the Project Site by the Contractor or Subcontractors, the Contractor will be required to provide copies of the waste transfer and disposal documentation to the Employer.

Storage of hazardous materials on Project Site /OHTT Laydown area will be kept to a minimum. The Contractor shall be responsible to adequately store any hazardous materials, according to the Applicable Laws, Permits and Codes, the recommendations of the suppliers/manufacturers and the standard industry practices. The hazardous storage area shall include measures for proper containment such as bund walls, access control, ventilation, fire extinguisher, and material safety datasheets on hand.

In addition, the Contractor shall be responsible for ensuring that all hazardous waste including contaminated or hazardous soil or sub soil arising from the Works is deposited, treated, stored, disposed of in accordance with the provisions of all Applicable Laws, Permits and Codes. The Contractor will be responsible for the provision of the approved disposal facilities, including obtaining of all necessary permissions

2.14. Security (PV and OHTL)

During the construction period, the Contractor will be responsible for ensuring the site and OHLT security. One of the first construction activities will be installing of the metallic perimeter fence. The site will be guarded by 24/7 security service during the construction period.

- Access control and security guards
- Temporary security (additional) at the laydown area and temporary areas for the safety and security of persons and property.
- There will be full perimeter protection security system (Thermal imaging cameras or similar) for operation of the plant.
- Security system and CCTV in HUB

During construction, each access point to Project Site and laydown area where materials are stored shall be equipped with CCTV monitoring system with remote access. The Contractor shall record access and exit times and verify possession of any weapons, illegal drugs, input and output of equipment and material and alcohol tests for personnel entering and leaving Project Site. It is expected that authorised people entering Project Site to include:

- The Contractor's personnel and Subcontractor's personnel, whom all have the necessary documentation already checked and available on the Project Site, trained in conformity with their duty in according to the Applicable Laws, Permits and Codes;
- Employer personnel and its representatives;
- Visitors, cleared by the Contractor and/or Employer; and
- Public authorities as required by Applicable Laws, Permits and Codes.

Access records will be submitted weekly to the Employer and available to be consulted on Project Site. All people entering Project Site must wear a visible identity card/badge. The Contractor will provide suitable security barriers to prevent access by unauthorised persons to areas within the Project Site where Works are ongoing, Project Site equipment is being kept, enclosed areas and areas containing dangerous equipment for the duration of the Project. Where barriers enclose Project equipment and areas containing dangerous equipment, the barriers will take the form of a secure locked cover/door/fence/gate. All barriers will not in themselves present a risk to health and safety.

For the OHTL, components and equipment will be stored in a secure laydown area. Any equipment left in the ROW will have 24/7 security provided by a private security provider.

2.15. Accommodation

Accommodation of all workers will be implemented by the Contractor / OHTL installation contractor, following Project Company E&S policies and Lender's requirements. The Contractor/OHTL installation contractor needs to ensure proper accommodation for all labour workers in appropriate accommodation facilities. If the capacity of third parties' accommodation facilities does not satisfy the demand, then Contractor / OHTL installation contractor is obliged to build temporary accommodation facilities on site. In all cases accommodation standards are required to align with the requirements of IFC/EBRD guidance on workers' accommodation:

processes and standards.[10] The project has committed to ensuring that workers will not be housed in the village of P.Lambrinovo, Smilets. Accommodation in other villages in Sisitra Region will be subject to suitalbity and alignment of accommodation standards with Lender standards. It is expected that workers requiring accommodation locally will be accommodated in Silistra. Temporary accommodation facilities at the project site or nearby are not envisaged at this time.

2.16. Construction workforce

All labour workers shall be employed directly by Contractor and OHTL installation contractor or by their subcontractors. For the main PV site (phase I and II), the number of workers will constantly be changing during the construction phase. The total workforce required during the peak construction period may be up to between 250-500 workers (skilled and non-skilled). Depending on construction activity there might be up to 300 people on site at the same time during peak periods. Table 4 provides and estimated breakdown of the workforce, including local hiring opportunities and the type of role (skilled, semiskilled, unskilled) that may be available. Local content commitments aimed at maximising opportunities to local communities and women are defined by the Owner in their Local Content Policy (part of the Project Company Labour Management Plan). The Contractor will develop a local hiring policy to the implemented by the Contractor and their subcontractors in accordance with this.

In accordance with the Project Company Local Content Policy, the definition of local is as follows:

I. nationals/residents/ suppliers from the indirect area of influence (defined as those from: the administrative area of Silistra Province of Bulgaria) (in priority); and
II. nationals/residents of Bulgaria providing evidence of the qualifications and experience required to skilled, management and or senior management positions

As shown in Table 4, there is potential for a small amount of unskilled or semi-skilled temporary employment generation during the construction phase that will result from construction of the foundations and building structures, drivers and security work t my be sourced from the indirect AOI in priority and more generally from Bulgaria. Estimates for local hiring potential (i) and (ii) above range between 124 and 146 people with up to approximately 18 to 30 unskilled jobs available to workforce pool (male and female) from the PACs.

Table 4: Estimated workforce breakdown

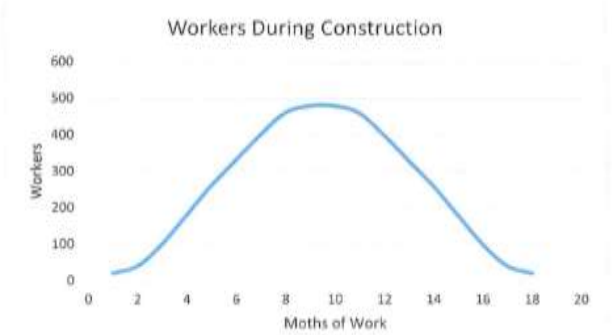
		Local hires	Category
Project manager	2		Manager
Construction manager	1		Manager
Site Manager	2		Manager
Design engineer	2		Supervisor
Quality expert	5		Supervisor
HSE (plus community liaison officer)	3		Manager

[10] Workers' accommodation: processes and standards A guidance note by IFC and the EBRD, European Bank for Reconstruction and Development and International Finance Corporation, 2009

		Local hires	Category
Machine operator	20	30-35% (4 to 7)	Skilled
Mechanical installation	170	30-35% (51 to 60)	Skilled / semiskilled / unskilled (50/25/25)
Electrical installation	120	30-35% (36 to 42)	Skilled / semiskilled / unskilled (70/20/10)
Construction worker	100	30-35% (30 to 35)	Skilled / semiskilled / unskilled (50/25/25)
Commissiong engineer	10	30-35% (3 to 4)	Skilled

Figure 11 depicts the mobilisation schedule for the workers (conservative) at each stage of the construction schedule.

Figure 11: Manpower plan



All workers shall fully comply with all prescribed H&S and labour welfare measures and precautions as defined in national law and in accordance with IFC PS2. To achieve this, specific requirements will be outlined in the project management plans (see chapter 21).

2.17. Transportation of components

The Site has very good accessibility from national roads, the surrounding area is mostly agricultural and road infrastructure is maintained to withstand the traffic load during the harvesting season. The vast majority (except the step-up transformer) of the components can be transported to site by standard truck. The most voluminous equipment will be PV modules (around 550 pcs of 40 feet containers) and steel structures (around 400 pcs of 40 feet containers, depending on the selected type of structure). PV modules will be coming from China to a European port, one of Koper (Slovenia), Varna (Bulgaria), Thessaloniki (Greece) and then reloaded to road truck. Steel structures will be coming most likely from China or Turkey. Chapter 6.12 presents route alternatives from Varna port to the location of Project.

2.18. Traffic management (construction)

During construction, the parking on PV Site, internal roads and OHTL ROW (either permanent or temporary) shall be well defined with a clear separation of the heavy machinery, trucks, personal vehicles, pedestrian areas such offices, paths, pedestrian crossing areas, etc. Workers will drive to site and park in defined carpark on site, car sharing will be encouraged. No mass transportation plan is envisaged at this time, but the need for this will be constantly reviewed.. Temporary parking on the PV Site and OHLT ROW shall be organised using reflective cones, intermittent lights or other signals (visible also during the night) defined in the Project site Traffic Management Plan. The Contractor will keep pedestrian and vehicle routes apart, especially where loading/unloading or movement of vehicles may take place. In case of cable crossing in internal roads, cable protection ramp or other protection mechanisms should be used.

Sufficient visible traffic management signage will be installed on Project Site, including internal roads, open trenches and excavations, road restrictions, pedestrian areas (offices, parking, etc), speed limits and speed bumps. Speed limit onsite will be 30 km/h under normal conditions with reduced speed limit of 20km/h around laydown areas and offices and under poor weather conditions such as fog, rain, hail, thunderstorm, high wind speeds and low visibility due to dust or other factors. Flag-persons must be employed in order to manage the traffic on Project Site.

2.19. Reinstatement of temporary areas

All areas of the PV Site used or disturbed by the Contractor, or their Subcontractors (apart from permanent works activities), will be reinstated to a condition similar or better than the pre-works condition, and in accordance with the relevant permits and land lease agreements. The reinstatement works will be carried out in such a way as to allow restoration of disturbed areas to proceed as early as possible and in a progressive manner. Every piece of litter or waste attributed to the construction of the Project will be removed from the Project Site by the Contractor. Prior to construction works commencing, the Contractor will submit its reinstatement plans for agreement with the Project Company in accordance with relevant permits and land lease requirements. The Contractor shall complete surveys and record the pre-construction condition of these areas including photos and arial footage and provide it to the Employers for information purposes. It is anticipated that reinstatement works activities will include, but not be limited to the following:

- Temporary construction compound;
- Temporary storage areas;
- Temporary hardstanding's;
- Access roads to Project Sites, and all private roads used for transport of personnel and equipment to Project Sites and;
- Any other area of the Project Site that has been disturbed during the course of the Works.

2.20. End of life disposal / decommissioning- PV

The expected design life of the Project is 25 years. The Project components will be continuously maintained throughout the lifetime of the Project. The condition of equipment will be reviewed at the end of the design life to determine whether it remains in a viable condition to continue operation after that time. The facilities may be upgraded or renewed based on the cost-benefit analysis.

If the site is decommissioned, a detailed decommissioning and rehabilitation plan will be developed before these activities take place, taking into consideration available disposal technologies, applicable legislation and international good practice that exists at the time of decommissioning.

2.21. Land ownership

The required land plots are as follows are as follows and illustrated in :

- PV Plant Phase I: on land plots 57251.500.1, 57251.500.2, 41143.128.904
- PV Plant Phase II: on land plots 57251.500.1, 57251.500.6, 57251.500.511, 57251.500. 579, 57251.500.586
- Substation with two step-up transformers: on land plot 57251.500.2
- OHTL "Pelikan" - various land plots
- OHTL "Dorostol" - various land plots

2.21.1. Main site

Most of the main site Project plots were urbanized land plots, part of a former airport owned by the Bulgarian state when the state sold them. However, two of the Project Plots (LP 586 and LP 904 with a total area of 41,901 sqm.) had the status of agricultural land.

Following privatisation in 2005, land acquisition for the PV land plots for the St. George Phase I and II areas started in 2009. The different land plots were purchased from various owners, including private landowners (through willing buyer, willing seller negotiations), the state and the municipality. The original buyers did not have the right to expropriate the land for the PV Project Main site. These plots are as follows and are further illustrated in Figure 12.

Table 5. PV Site Land ownership overview

Land plot identification	Area (m^2)
57251.500.511	108,618
57251.500.1	899,359
57251.500.2	590,202
57251.500.586	18,697
57251.500.579	12,075
57251.500.6	6,358
41143.128.904	
Total	1,658,513

Figure 12: Land plot requirements

Until 2022, the Company held title over the Project Plots and the Foundation Land Plots. In August 2022, YGY Industries purchased the Project Plots and Foundation Land Plots from the Company and is the current owner thereof. The purchase price was fully paid by YGY Industries to the Company. The intention is for YGY Industries to grant the Project Company a property right to build (superficies) over the Project Plots (and to transfer back to the Project Company or establish similar rights to build over the Foundation Land Plots) as required for the purposes of the Project Company being able to develop the Project.

The right to build is a property right (i.e. not a contractual lease or right to use) and is established, registered and protected basically in the same way as the transfer of ownership rights. This structure is, in principle, possible and applied locally in many similar transactions where the sellers prefer to keep title over the project lands so that they can use the lands for their purposes after the expiry of the agreed operational life of the project. The terms and conditions of such transactions (duration of the rights to build, the consideration payable by the Project Company, etc.) must be agreed upon as part of the terms of the SPA for the Proposed Transaction, and the implementation of such transactions would be a condition precedent for closing the Proposed Transaction. The transaction is to be concluded in the form of a notary deed. Private-owned land is intended to be rented by the Project Company for the Project's lifetime.

2.21.2. OHTL

The compensation process for the OHLT servitudes was conducted under a compulsory agricultural land expropriation process for the establishment of the servitudes (described in more detail in section 4.0 and the Livelihood Restoration Framework[11]. The whole RoW for both lines has been acquired under easement rights.

The land for “Pelikan” OHTL was acquired via easement agreements concluded in 2009 and compensated in 2012 via a decision from the Municipality of Silistra.

The land for “Dorostol” OHTL was acquired via easement agreements concluded starting 2009 and compensated in 2012 via a decision from the Municipality of Silistra[12].

[11] Further information on the adequacy of this process in relation to the requirements of IFC PS5 is provided in a separate document St. George Livelihood Restoration Framework and Gap Analysis.

[12] Further information on the adequacy of this process in relation to IFC PS5 is provided in a separate document.

Table 6 summarises information about the number of land plots required for the and OHTLs. These land plots are further illustrated in

Further information will be provided in the livelihood restoration plan (LRP).

Table 6: Summary of land plot requirements for OHLT (Dorostol and Pelikan)

Community	Number of land plots affected	Total land aera of owners (M2)	Total Area occupied by the easement (M2)	Total length of line (m)	Land agreement type
Pelikan					
P. Lambrinovo	2	592.308	0	28.99	Private
Kalipetrovo	67	670.841	80.17	3065.00	Private / Public organisations / Public
Aydemir	18	159.371	19.99	654.88	Private / Public organisations / Public
Dorosol					
Aydemir	27	260,315	58,803		Private / Public organisations / Public
TOTAL	114	261737.52	100.16	3749.06	

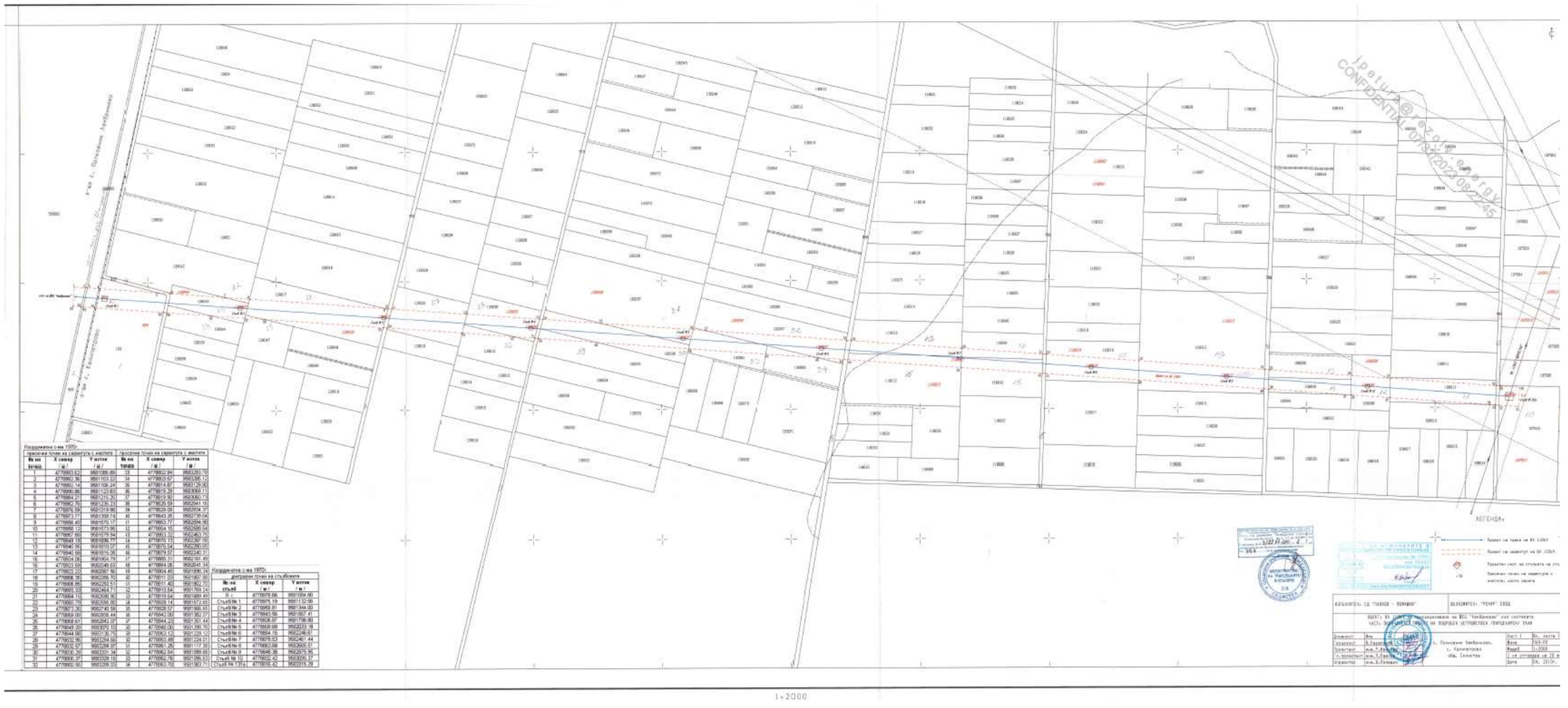


Figure 13: Dorostol OHLT land plots overview map

Figure 14: Pelikan OHLT land plots overview map (northern section)

Figure 15: Pelikan OHLT land plots overview map (southern section)

2.22. Project budget

The total capital expenditures (CAPEX) budget for the Project (PV - Phase I and II and OHTL) considering the aforementioned Project components is approximately ~ US$275 million.

The total Project operating expenditures (OPEX) are estimated to be approximately ~ US1.3 million per year.

A breakdown of E&S budget for implementation of E&S requirements is provide in the ESMP.

3. ANALYSIS OF ALTERNATIVES

The current design concept is result of number of iterations / alternatives, mainly of different layouts, mounting structure configuration, modules size, DC capacity, tilt, etc. The final concept is driven by lowest LCOE[13]. The analysis of alternatives consisted of a systematic comparison of feasible alternatives to the project in terms of:

- Location
- The technology used in the proposed project
- Design, in terms of potential environmental impact.
- Access options

The analysis of the alternatives indicates the option that led to the choice of the solution according to the project. The evaluation criteria considered, for determining the optimal alternative that fulfils the principles of sustainable development, considered:

- the feasibility of the solution from an economic and social point of view;
- minimization of negative effects on environmental factors;
- concrete environmental conditions.

3.1. No Project Alternative

The No Project Alternative ("do nothing" option) will avoid any further potential E&S impacts, noting that some land clearance has already been performed by the previous landowner. If the development does not proceed the cleared land will likely be left to naturally return to pre-clearance values as described chapter 6.

. This may result in unintended environmental factors including:

- Further dilapidation of buildings and urban features of the site e.gg airfield apron)
- uncontrolled storage of waste on the site, this can cause a potential pollution of the underground water in the area, there is a risk of surface water pollution;
- the risk of soil erosion and dust from already cleared areas;
- potential for spread of invasive species.

Not proceeding with the Project will hinder the objectives of the country's renewable energy transition goals, this investment being of particular importance for the fulfilment of Bulgaria's RES policy objectives as part of its obligations under Directive 77/2001/EC, part of the EU accession agreement. From the point of view of the relevant environmental and social aspects, it can be considered that, in the absence of the implementation of the project, the existing anthropogenic pressures in the area will remain constant.

- the lack of diversification of economic and social life, of the development framework of the local community;

13 Levelized Cost Of Electricity

- without the development of the roads in the area, they will remain in a state of degradation;
- the lack of investment will mean a loss for the local community's budget, which leads to a diminution of the locality's development chances;
- the population, the heritage elements and the landscape will not undergo changes;
- the lack of investment increases the energy risk in the current context of the lack of fossil energy resources;

In conclusion, through the proposed project, positive effects are obtained on:

- the environment through the management and sustainable use of the area, taking in consideration that the former military airfield was decommissioned several decades ago.;
- economic and social effects through the enhancement of the area, and through the emergence of new economic activities for the supply of electricity;
- reducing the polluting effects due to the replacement of non-renewable energy resources;

3.2. Alternative locations / OHTL routing

In identifying a suitable site for PV Project, various elements need to be considered. These include factors such as:

- Land availability
- Environmental restrictions – distance to natural protected areas, presence / absence of protected fauna species, flora species and habitats.
- Distance to water bodies
- Land use
- Road access
- Grid connection

The Developer considered all the elements mentioned above to identify the site proposed. This site is appropriate for development of the project, considering the factors:

- Opportunity to re-use existing brownfield land– the location is a former military airfield, decommissioned several decades ago and minimise impact on existing agricultural land.
- Environmental restrictions – despite the proximity of PV site with protected area BG0000169 "Ludogorie - Srebarna" (SCI), no elements or types of natural habitats subject to protection have been identified in the area
- Distance to water bodies – over 600 m from nearest water body located in S-W of village P. . Lambrinovo
- Land use - most of the project plots are part of a former airport (decommissioned) and also 2 agricultural land plots.
- Proximity to existing public road – from road 218 which runs adjacent to the site in the Eastern part (see also section 3.3. below)
- Proximity to existing grid connection – the site is located in the vicinity of existing power lines – “Pelikan” and “Dorostol requiring relatively short new overhead lie grid connections.

Given the above, the Company didn’t consider other location alternatives for the project.

3.3. Access Alternatives

Three access points have been identified for use by the Project based on existing roads and access points to minimise new access points onto existing public roads. The three access points are illustrated in Figure 16.

Figure 16: Alternative access points

Considering the sensitivities of the local village of P. Lambrinovo the three access points have been designated for specific uses with Access point 3 (which requires vehicles to route through the residential areas of the village) designated as a backup access point only.

3.4. Technology Alternatives

3.4.1. Technology Alternative 1 - conventional energy sources – by combustion

Within this technological alternative, it was proposed, for comparison, the implementation of a power plant with a maximum installed capacity of 195.75 MW consisting of 25 thermal engines with an individual installed capacity of 7.83 MWe. The electricity produced in the new plant will be injected into the SEN, through a new electrical station that will be located near the plant. In the following, the hypotheses that were the basis for the development of this alternative are presented:

The heat engines will operate simultaneously 5,000 hours/year with variable load as follows:

- 3.333 hours at minimum power, the energy produced being sold in full in the Day-Ahead Market (PZU)
- 1,667 hours at maximum power, the energy produced being utilized in the PZU and the Balancing Market (PE);

- Corresponding to this operating regime, the average net return is approx. 46%, the resulting annual production is 585.000 MWh/year;
- The electricity required for the internal consumption of the power plant will be provided from its own production, the rest of the energy being injected into the SEN;
- For natural gas, the lower calorific value was considered, PCI = 9.5 kWh/m^3;

- Domestic electricity consumption was estimated to be 10% of the total electricity production;
- In order to supply the power plant with natural gas, a new connection will be necessary to connect to a new natural gas metering station and the power plant;
- In order to evacuate the electricity, a cable was considered, which will make the connection between the power plant and the 110 kV power station;
- The equipment related to the power plant will be located in a new building especially intended for the purpose, which will have an area of approximately 14,500 sqm and a cornice height of approximately 10 m.
- Emissions of 0.35t CO_2/MWh for each MWh of electricity produced
- 0,35t CO_2/MWh x 585.000 MWh/year = 204.750 tCO_2/year (for 25 years emissions of 5.118.750 t CO_2)
- The new power plant will include the following main equipment:
  - Thermal engine
  - Supply water system
  - Compressed air system
  - Group cooling system
  - Combustion gas exhaust system
  - Power plant premises ventilation system: Sub - air intake system, Sub - air exhaust system
  - Oil storage

The main environmental effects of thermal engine power plants are associated with the use phase and are mainly related to the energy efficiency of the product and the greenhouse gas (GHG) emissions generated during its operation. Greenhouse gas emissions mainly consist of CO_2 emissions resulting from combustion. Other environmental effects such as acidification, ground-level ozone and air, water and soil pollution are produced by air emissions generated during operation, which include emissions of nitrogen oxides (NOx), carbon monoxide (CO) , gaseous organic carbon (OGC) and particulate matter (PM). Other relevant environmental aspects include noise and product design.

3.4.2. Technology Alternative 2 - renewable energy sources - wind energy

At least 30-33 large wind turbines would be needed to be installed to produce 199 MW. In order to produce this energy, at least 600-800 m between turbines will be needed so the Wind farm will occupy land plots spread on a larger area than the Project Company is planning to use at this time. In addition, the wind farm may have additional environmental considerations over solar power including avifauna collision risks, operational noise, landscape and visual impacts, shadow flicker and traffic and transportation risks.

3.4.3. Technology Alternative 3 - renewable energy sources - photovoltaic energy

This technological alternative for obtaining electricity that was studied involved the siting of a 199 MW-AC photovoltaic power plant in the site location (the area of land owned by the Developer) on which the photovoltaic panels could be installed. Although theoretically the solar panels cover a large part of the surface of the land on which they are mounted, we cannot speak of an effective

occupation of the land because they are placed at a height of over 1 m and have no contact with the ground except at the level of the infrastructure, the surfaces of the foundations, the ground remains arable land / green areas and access roads for maintenance). Furthermore, solar PV can be considered to have fewer E&S risks and impacts compared to thermal and wind power generation, including lower GHG emissions. Considering that solar energy does not produce GHG, the reduction in CO2 emissions is calculated at 69,65 t CO2/year. (1.741,25 t CO2 for 25 years).

3.4.4. Conclusion regarding technology alternatives

Analysing the three technological alternatives presented for electricity production:

- Conventional energy sources – by combustion
- Renewable energy sources - wind energy
- Renewable energy sources - solar energy - photovoltaic park in the configuration proposed by this project

The Developer has chosen the alternative that leads to the least possible impact on the environmental and social factors.

3.5. Access

3.6. Design Alternatives – design parameters

The Project Company took into consideration a performed design optimization for the solar PV plant by performing multiple simulation scenarios using representative blocks and typical system losses. The Design optimization exercise was approached as a twostep process:

- First step – evaluation of all the possible combinations by using both P-type and N-type PV module technology with Central and String inverter using three mounting technology options E-W orientation, Tracker and Fixed tilt. In this step the primary objective was to fit maximum capacity within the available plot area using the different technology and mounting configurations and to compare the LCOE. Further in this step, the pitch of the system is also varied for optimization for the tracker systems (1 P and 2P), and for fixed tilt systems tilt both tilt and pitch were varied for (3H and 4H) systems. The results indicated the following:
  - E-W configuration was able to accommodate a high DC capacity close to 210MWp but had a very high LCOE.
  - For N-type and P-type PV module technology, it was noted that specific yield was comparable and the difference in temperature loss between these two variants is negligible since the site is also located in a colder climate.

Due to aforementioned reasons E-W configuration and N-type technology was not chosen for further analysis.

- In the second step, the Company evaluated the four layout configurations using 1 type of module technology (Bifacial PERC Monocrystalline), 2 types of inverter technology (including string and central inverters) and 2 types of mounting arrangement (including fixed tilt and Single axis tracker). During this stage GCR (Ground Coverage ratio) was kept constant with the objective to fit maximum DC capacity at the site. It was considered fixed tilt and single axis tracker with 4H and 2P mounting configuration respectively, as in Table 7.

Table 7: Technologies considered for the solar PV design optimization

Manufacturer	Technology	Rated Nominal Power	Model
PV Module			
Trina Solar	Bifacial PERC Monocrystalline	650 Wp	TSM-DEG21C.20-650
Inverters			
Sungrow	Central	1100 kVA at 50°C	SG1100UD-20
Kaco new energy	String	155 kW at 50°C	Blueplanet-155-TL3

The main characteristics of the four selected design parameters combinations based on the design optimization task performed are provided in Table 8 below.

Table 8: Main characteristics of the 4 selected design parameters combinations

		Scenario 1 2P Tracker String	Scenario 2 2P Tracker Fixed	Scenario 3 Fixed tilt String	Scenario 4 Fixed tilt Central
Structure	Azimuth (0°=South)	0	0	0	0
	Mounting system	Single axis tracker, 2 Portrait	Single axis tracker, 2 Portrait	Fixed tilt, 4 Landscape	Fixed tilt, 4 Landscape
	Tilt angle	±60°	±60°	20°	20°
	Row spacing (m)	9.6	9.6	8.2	8.2
	Backtracking	Yes	Yes	N/A	N/A
	Number of modules per structure	60	60	120	120
	GCR	49.88%	49.88%	64.29%	64.29%
Modules	PV modules	Trina Solar TSM-DEG21C.20-650	Trina Solar TSM-DEG21C.20-650	Trina Solar TSM-DEG21C.20-650	Trina Solar TSM-DEG21C.20-650
	PV module type	Bifacial PERC Monocrystalline	Bifacial PERC Monocrystalline	Bifacial PERC Monocrystalline	Bifacial PERC Monocrystalline
	PV module capacity (Wp)	650	650	650	650
	Number of PV modules	229,080	229,080	295,140	295,140
Inverters	Inverters	Kaco new energy Blueplanet-155-TL3	Sungrow SG1100UD-20	Kaco new energy Blueplanet-155-TL3	Sungrow SG1100UD-20
	Inverter type	String	Central	String	Central
	Inverter capacity (kWAC) *	155	1100	155	1100
	Number of inverters	960	174	1,230	174
Layout	Modules per string	30	30	30	30
	Number of strings per inverter	7 / 8	56 / 57	7 / 8	56 / 57
	Total number of strings	7,636	7,636	9,838	9,838
Total power	Total rated power P_{DC} (kWp)	148,902	148,902	191,841	191,841
	Total inverter power P_{AC} (kW) *	148,000	147,400	190,650	191,400
	Maximum power at connection point (kW)	200,000	200,000	200,000	200,000
	Rate P_{DC}/P_{AC} *	1.01	1.01	1.01	1.00

** Considering maximum inverter power at 50°C. The Power x Temperature curve of the equipment was considered according to the equipment data sheet.*

The following notes with respect to the simulations performed under the optimization task were considered:

- The DC/AC ratio was held constant at approximately 1.

- The available buildable area was held constant at approximately 1.666 km^2 as a limiting factor, which was estimated based on the available site layout information.
- 14.5 % margin in the area was included to account for solar PV related infrastructure as estimated from the seller supplied layout.
- A 200 MW grid limitation was implemented, however none of the simulations showed any grid limitation losses as the maximum capacities which could be fitted in the buildable area was below 200 MW.
- 60-degree tilt range for the 2 Portrait tracker was considered as it is available in the industry.
- 20-degree tilt angle was determined as optimal for the fixed tilt structure at the specific 8.2m pitch distance, considering a 5-degree resolution.
- A maximum of 50% and 65% GCR was considered for each of the tracker and fix tilt options respectively, with a 0.1m pitch distance resolution. GCR is one of the limiting factors considered during the optimization stage for determining the maximum capacity.
- 30 module string length was determined as the maximum considering the extreme temperatures from the SolarGIS 15-minute temperature data available.
- A 2.5m axis height was used for the tracker and 0.5m ground clearance for the fix tilt structure, both resulting in a commonly seen 0.5m clearance to ground, this was also used to estimate the effect of snow soiling.
- A representative string (155kWac) and modular central (11 00kWac) inverter was used for the simulations, some slight variation might occur depending on the final inverter implemented.
- A modern representative bifacial mono PERC module (650Wp) with 2.384m x 1.303m dimensions was used for the simulations, some slight variation might occur depending on the final module implemented.
- The various losses were implemented as agreed with the customer

4. REGULATORY AND POLICY FRAMEWORK

The objective of this chapter is to highlight the political, legislative and administrative framework of the Project, including the social and environmental policy requirements of the lenders.
This will include:

- Involvement of the financier in the project
- Applicable environmental and social assessment requirements of international financial institutions
- Applicable legislative framework of the country where the investment is proposed, the international regulatory framework, standards and guidelines, and treaties.

4.1. Relevant government ministries

The key national organisation involved in the Project are:

- Ministry of Environment and Water of the Republic of Bulgaria (MEW) - the Regulator and the official governmental entity responsible for the protection of the environment in Bulgaria - through Regional Inspectorate of Environment and Water Ruse (RIEW) - the regional entity responsible for the approval of project in terms of environmental protection
- Basin Directorate (water management)
- Silistra District Governor
- Municipality Silistra - Local Municipality
- Silistra Regional Road Administration
- ESO – Electricity System Operator
- Bulgartransgaz EAD - a combined operator performing licensed activities of natural gas transmission and storage.
- Fire Safety and Civil Protection Chief Directorate, Ministry of Interior
- Agency of Geodesy, Cartography and Cadastre of the Ministry of Regional Development and Urban Development.

4.2. Environmental Law and national EIA process

As indicated in the introduction, a national EIA is not required for the Project based on the original configuration of the Project which divided the Project into phases. The screening process concluded that the PV plant can be constructed and operated in an environmental and social sound manner subject to the consideration of the following conditions:

- The waste generated during the construction is to be treated in accordance with art. 18 of the law for waste management.
- Wastewaters from the administrative building to be deposited in the ground only after compulsory purification to 3rd category in accordance with Ordinance 7 for the norms of quality of the surface waters (State Gazetter 96/1986).
- During design phase to be considered necessary equipment for releasing the surface water.
- During construction and operation of the plant the requirements of Art. 15 and 16 of the for the soils to be complied with.
- Passing [transportation] of equipment to be conducted only using existing paths [roads].

- The existing green belts at the borders of the land plots to be observed and maintained with a height of no less that one meter for ensuring appropriate conditions for nesting birds.
- Not to cut any trees at the borders of the land plots.
- To ensure compliance with the requirements of Art. 38, 45 and 46 for the Law for biological diversity
- The construction plan to be coordinated with the Ministry of Healthcare.

These conditions are also be reflected in the ESMP for implementation by the relevant contractor.

4.3. National E&S legislation and standards

The Project is required to comply with all Applicable Laws, Permits and Codes of Bulgaria and particularly in compliance with:

- Bulgarian Health and Safe Working conditions act
- Regulation No. 2 of March 22, 2004, on the minimum requirements for health and safe working conditions when performing construction and assembly work.
- Bulgarian Environmental Law
- Bulgarian Health law
- EN ISO 9001:2015, ISO 14001:2015 and ISO 45001: 2018

Table 9 further summarizes the key relevant legislation for this Project.

Table 9: Summary of relevant national legislation

Topic Covered	Legislation	Legislation Number and Date	Relevance to Project
Accidents and Emergencies	Ordinance on ascertaining, investigation, registration and reporting of the occupational accidents	SG № 61 of 21/01/2001 SG № 19 of 19/02/2002	This ordinance regulates the procedure of ascertaining, investigation, registration and reporting of the occupational accidents.
Archaeology / Cultural Heritage	Ordinance № 5/14.05.1998 for designation of immobile cultural and historical items as cultural monuments	SG № 60 of 27/05/1998 SG № 20 of 06/03/2001	This ordinance covers the procedure for designation of the immobile cultural and historical items as cultural monuments.
	Ordinance to implement the terrain archaeological surveys	SG № 18 of 01/03/2011	This ordinance covers the exploration of archaeological items.
	Guide to implement the terrain archaeological surveys	SG № 12 of 07/02/1997	This ordinance covers the exploration of archaeological items.
Biological Impact	Environment Protection Act	2004/35/EC SG № 91/25 of 09/2012 SG № 38 of 18/05/2012	This Act makes provision for: 1. Obtaining and furnishing information concerning the state of the environment; 2. The control of the state of the environment; 3. The assessment of the impact on the environment; 4. The planning and implementation of environmental protection activities; and 5. The rights and duties of central and local authorities, bodies corporate and physical persons as regards environmental protection.
	Biodiversity Act	SG № 77 of 2002 SG № 32 2002 of 24/04/2012	The articles of relevance are: Article 2 1. Conservation of natural habitat types of representatives of the Republic of Bulgaria and of Europe and habitats of endangered, rare and endemic plant, animal, and fungal species within a National Ecological Network; 2. Conservation of the protected plant, animal, and fungal species of the flora, fauna, and mycota of the Republic of Bulgaria, as well as of those subject to use and trade; and

Topic Covered	Legislation	Legislation Number and Date	Relevance to Project
			6. Conservation of centuries-old and remarkable trees. Article 3 Development a National Ecological Network which shall comprehend: 1. Special Areas of conservation part of the European Ecological Network NATURA 2000, which may incorporate protected areas; 2. Protected areas outside Special Areas of conservation; (2) In the National Ecological Network priority will be included CORINE sites, Ramsar sites, Important Plant Areas and Important Bird Areas. Art. 37. Species from Appendix 3 are protected in all Bulgaria. Art. 38 prohibitions for capture, killing or any kind of breaching of species included in Appendix 3. Art. 48 Exceptions to the prohibitions for species in Annex № 3. Art. 49 Written permission from the Minister of the Ministry of Environment and Water for exceptions. Art. 51 Terms and conditions for issuing permits under Art. 49 is determined by an Regulation approved by the Minister of Environment and Water and Minister of Agriculture and Food.
	Ordinance № 8 for terms and conditions for issuing permits for exemptions from the prohibitions introduced by the Biodiversity Act for animal and plant species listed in Appendix № 3, the species of Appendix № 4 for all bird species outside the Appendix № 3 and № 4 and indiscriminate use of appliances, tools and methods of capture and killing of Annex № 5	№ 4 of 16/01/2004	This ordinance sets the terms of conditions for issuing permits under Art. 49 of the Biodiversity Act.
	Directive on the conservation of natural habitats and of wild fauna and flora Directive on the conservation of wild birds - Ordinance № 5 on the conditions	92/43/EEC 79/409/EEC SG № 73 of 19/08/2003	The ordinance regulates the terms and conditions for the development of action plans for animal and plant species, species population status, its priority habitats, threats and limiting factors and regime of their protection.

Topic Covered	Legislation	Legislation Number and Date	Relevance to Project
	and order for the elaboration of action plans for animal and plant species		
	Directive on the conservation of natural habitats and of wild fauna and flora - Ordinance for Assessment of plans and projects that will significantly affect Natura 2000 sites	92/43/EEC SG № 73 of 11/09/2007 SG № 3 of 11/01/2011	This directive covers the conditions and procedures for assessment of the compliance of plans, programmes, projects and investment proposals with the subject and aims of protected zones preservation.
	Forestry Act	SG № 19 of 08/05/2011 SG № 38 of 18/05/2012	This Act regulates the ownership and the management of forests in Bulgaria with the aim to ensure the sustainable management of Bulgarian forests and forest resources. It applies to all forests, as well as the lands included in the national forest fund, regardless of their property status. Forest within protected areas is also regulated by the Protected Territories Acts and the Biodiversity Act.
	Rules for implementation of the Forestry Act, adopted by Decree № 80 of 1998	SG № 41 of 10/04/998 SG № 7 of 21/01/2011	Relevant articles are: Art. 1. The rules set conditions and order for management, reproduction, use and protection of forests and forest lands, and relationships associated with ownership of them.
	Directive on the conservation of natural habitats and of wild fauna and flora and Directive on the conservation of wild birds - Protected Areas Act	92/43/EEC 79/409/EEC SG № 133 of 11/11/1998 SG № 19 of 08/03/2011	The purpose of this Act is to conserve and preserve protected areas as a national and human wealth asset and as a special form of conservation of Bulgarian nature, conducive to the advancement of culture and science and to public welfare.
	Ordinance on developing protected areas management plans	SG № 13 of 15/02/2000	Under Article 3: (1) A management plan shall regulate the activities in the respective protected area within the boundaries delimited by the designation order of the said area; and (2) Biotic and abiotic features and anthropogenic factors within areas adjoining the protected area may be subject to investigation where: 1. The protected area is part of a habitat of European importance, or a habitat included in lists under international conventions in the

Topic Covered	Legislation	Legislation Number and Date	Relevance to Project
			sphere of biodiversity; 2. A need is ascertained to clarify the impact of the said features and factors on the protected area; and 3. This is expressly indicated in terms of reference endorsed according to the procedure established by this Regulation. (3) The information, conclusions and assessments in the cases covered under Paragraph (2) shall be indicated in the plan under separate items.
EIA	Environment Protection Act	85/337/EEC, amended by 97/11/EC, amended and supplemented by Directive 2003/35/EC SG № 91/25 of 09/2002 SG № 38 of 18/05/2012	
	Ordinance on the conditions and order of conducting EIA including environmental impact assessment in transboundary aspect	85/337/EEC, amended by 97/11/EC, amended and supplemented by Directive 2003/35/EC SG № 87 of 23/03/1995 SG № 3 of 11/01/2011	This legislation relates to: 1. Assessment of the need for making an EIA; 2. Terms and procedure for consultations. Determination of the scope, the contents and the form of the EIA report; 3. Organisation of public discussion on the EIA report.
Health Impacts	Health Act	SG № 7004 SG № 40 of 29/05/2012	This act regulates public relations connected with the health of citizens (including the affected by the project).
	Healthy and Safety at Work Act	SG № 124 of 23/12/1997 SG № 7 of 24/01/2012	The articles of interest are: Art. 25 paragraph 1 the employers shall provide services to employees of registered occupational medicine. Art. 25 paragraph 1 the employers shall provide services to employees of registered occupational medicine. Art. 25a paragraph 1 the main activities of the occupational health services are: 1. Assistance to employers to create an organization for health and safety at work; 2. Assessment of professional risks and analysis of health conditions of the workers; 3. Proposing measures to eliminate and reduce the risk;

Topic Covered	Legislation	Legislation Number and Date	Relevance to Project
			4. Health monitoring of workers; and 5. Training of employees and officials on the rules for health and safety at work.
	Ordinance № 2/22.03.2004 on the minimum requirement for health and safety in carrying out construction works	№ 2 (SG № 37 of 22/03/2004)	This ordinance covers the health requirements for carrying out construction work, ensuring healthy and safe working conditions and environmental protection.
	Ordinance № 5 on the order, manner and frequency of risk assessment	№ 5 (SG № 47 of 1999)	This ordinance shall regulate the procedure, manner and frequency of risk assessment for health and safety of employees.
	Ordinance № 36 for the conditions for the exercise of public health control	№ 36 (SG № 63 of 07/08/2009 and SG № 38 of 17/05/2011)	This ordinance covers the conditions and procedures for the exercise of public health control subjects of public importance; products and goods of importance to human health; the activities of importance to human health; the factors of environment. Article 19 Para 1 The regional health inspections assess compliance with health requirements of investment projects and project at the request of physical or legal persons and elaborated health conclusion. Article. 20. Para. 1 State health inspectors from Regional Health Inspectorate will participate in the state acceptance committee for commissioning of constructions from the first, second and third category.
	Ordinance № 3 for minimum safety and health of workers using personal protective equipment at work	№ 3 (SG № 46 of 2001)	This ordinance covers the specifies the minimum safety and health of workers using personal protective equipment at work.
	Ordinance № 3/14.05.1996 on instructing the employees on safety, hygiene and fire protection at work	MNE (2006) 56047 SG № 44 of 01/07/1996	The ordinance regulates the instructing of the employees on safety, hygiene and fire protection at work.
	Ordinance № 14/7.08.1998 on the occupational health services	MNE (2006) 56049 SG № 95 of 14/08/1998	This ordinance sets rules for the internal organisation, tasks and functions of the state labour medicine services.
	Ordinance № 15/31.05.1999 on the arrangements and requirements for development and implementation of physiological modes of work and recreation	MNE (2006) 56378 SG № 54 of 19/06/1999	The ordinance describes the arrangements for schedule of work and rest during the working day in order to reduce the tiredness and to keep good health.

Topic Covered	Legislation	Legislation Number and Date	Relevance to Project
	Ordinance № 3/28.02.1987 on the obligatory preliminary and periodic medical examinations of the workers	SG № 16 of 27/02/1987 SG № 78 of 30/09/2005	Organisation of the obligatory preliminary and periodic medical examinations of the workers.
Land Impacts	Spatial Planning Act	SG № 1/02 SG № 87 of 02/01/2001 SG № 3 of 18/05/2012	Chapters of importance are: Ch. 2 Purpose of Territories and Landed Property; Ch. 3 Arrangement of Territories and Landed Property; Ch. 4 Technical Infrastructure's Net and Facilities; Ch. 5 Arrangement schemes; Ch. 6 Arrangement plans; Ch. 8 Investment design and permission of construction; Ch. 9 Beginning of the construction works and relationship "Who is Who" in the construction process; Ch. 10 Design and Construction Insurance; Ch. 11 Completion of the construction works. Usage Permission; and Ch. 13 Temporary roads. Crossing of third-party land ownership and right of way Removing existing constructions.
	Regulation № 16/9.06.2004 on the Energy Sites Servitudes (SG № 88/2004, last amended, SG № 77/2.09.2008);	SG № 88 of 08/10/2004 SG № 77 of 02/09/2008	Articles of interest are: Art. 14 - Minimal margins (dimensions) of easement zones for energy sites for storage, transmission, distribution or transformation of natural gas.
	Soil Act	2004/35/CE SG № 89 of 06/11/2007 SG № 98 of 14/12/2010	Under Article 2; this act discusses: 1. Prevention of soil deterioration and the damages; 2. Conservation of the soil;
	Agricultural Land Conservation Act	2004/35/CE SG № 35 of 24/04/1996 SG № 39 of 20/05/2011	Under Chapter 2 and 4, this act discusses: 1. Protection of the agricultural lands against damages; and 2. Reinstatement of lands.
	Ordinance № 3 on the limit values of hazardous substances in the soil	№ 3 (SG № 71 of 12/08/2008)	The norms for the permissible limits of harmful substances in the soils are determined on the basis of the risk assessment for the environment and the human health at three levels: 1. Low assessment concentrations; 2. Maximal permissible concentrations; and 3. Interventional concentrations.

Topic Covered	Legislation	Legislation Number and Date	Relevance to Project
	Ordinance № 26/2.10.1996 on environmental liability with regard to the prevention and remedying of environmental damage	2004/35/CE SG № 89 of 22/10/1996 SG № 30 of 22/03/2002	This ordinance covers: 1. Reinstatement of damaged terrains; 2. Stripping, storage and utilization of the humus layer; and 3. Terrains for reinstatement, humus utilization and sites for humus depose.
Labour and Working Environment	Ordinance on working time, rest and leave	SG № 6 of 23/01/1987 SG № 19 of 06/03/2012	Description of requirements relating working time, rest and leave.
	Ordinance № 7 on the minimal requirements for health and safety of the working sites and in usage of working equipment	SG № 88 of 08/10/1999	Under section 3, 7 and 9, articles of importance are: 1. Workshops, other production building and working sites; 2. Working environment, Dust, toxic and other substances; and 3. Providing of PPE and clothing gear.
	Labour Code	SG № 26 of 01/04/1986 SG № 49 of 29/06/2012	Chapter 13: Health and Safety at Work regulates: 1. Obligations of the employer in order to ensure health and safety at work so that any risk for the workers could be eliminated; 2. Obligation of the employer to provide sanitary, welfare and medical services; 3. Special work clothes and PPE; 4. Limited Duration of work in harmful or hazardous environment; 5. Periodical medical examinations; and 6. Prevention and reporting of injuries and diseases.
	Ordinance on the essential requirements and conformity assessment of electrical equipment designed for use within certain voltage limits	MNE (2007) 55758 SG № 37 of 08/05/2007	The ordinance sets essential requirements and describe the conformity assessment of electrical equipment designed for use within certain voltage limits.
	Ordinance № 11/2.03.1987 Ordinance on the rooms for personal hygiene of women and rest of pregnant women's	MNE (2006) 55945 SG № 57 of 24/07/1987	The ordinance sets requirements for the construction and equipment of rooms for rest, personal hygiene and toilets for pregnant women and the responsibility of the management.
	Ordinance № 7/16.06.1993 on the prohibition of certain dangerous and heavy jobs for pregnant women	MNE (2006) 55943 SG № 58 06/07/1993	The ordinance is related to prohibition of certain dangerous and heavy jobs for pregnant women.

Topic Covered	Legislation	Legislation Number and Date	Relevance to Project
	Ordinance № 4/2.08.1995 on the signs and signals of work safety and fire protection	MNE (2006) 55016 SG № 77 of 01/01/1996	This ordinance describes the signs and signals of work safety and fire protection.
	Ordinance № 3/27.07.1998 on the functions and tasks of officials and of the specialised authorities at enterprises for organising the implementation of activities relating to the protection and prevention of occupational risks	SG № 91 of 09/08/1998 SG № 102 of 22/12/2009	The ordinance shall regulate the functions and tasks of officials and of the specialised authorities at enterprises.
	Ordinance № 16/31.05.1999 on the Physiological Standards and Rules for Manual Handling of Loads	SG № 54 of 15/06/1999 SG № 70 of 26/08/2005	The ordinance sets the physiological norms and rules for manual handling of loads and the responsibilities of employers and employees.
	Ordinance № 13/30.12.2003 the Protection of the Health and Safety of Workers from the Risks Related to Chemical Agents at Work	SG № 8 of 30/01/2004 SG № 2 of 06/01/2012	Requirements on the protection of the Health and Safety of Workers from the Risks Related to Chemical Agents at Work.
	Ordinance № 5/20.04.2006 to ensure the health and safety of workers in limited employment relationship or in temporary employment relationship	MNE (2006) 56199 SG № 43 of 26/05/2006	The ordinance requires health and safety of workers in limited employment relationship or in temporary employment relationship.
	Ordinance № 3/25.01.2008 on the minimum health and safety requirements regarding the exposure of workers to the risks arising from vibration	MNE (2007) 51246 SG № 40 of 06/07/2005	The ordinance sets minimum health and safety requirements regarding the exposure of workers to the risks arising from vibration.
	Ordinance № RD-07/8 of 20.12.2008 on minimum requirements for signs and signals for safety and/or health at work	SG № 3 of 13/01/2009	This ordinance sets the minimum requirements for signs and signals of work safety and fire protection.
Impacts on Atmosphere	Clean Air Act	2008/50/EC SG № 45 of 28/05/1996	The basic indices, characterizing the quality of the air in the surface layer of the atmosphere, are the levels of:

Topic Covered	Legislation	Legislation Number and Date	Relevance to Project
		SG № 38 of 18/05/2012	1. Suspended particles; 2. Fine dust particles; 3. Carbon dioxide; 4. Lead (aerosol); and 5. Benzene.
	Ordinance № 7/3.05.1999 on Ambient Air Quality Assessment And Management	96/62/EC SG № 45 of 14/05/1999	Part. 3. A combination of measurements and modelling techniques may be used to assess ambient air quality where the levels over a representative period are below a level lower than the limit value, to be determined according to the provisions referred to in Article 4 (5). Part 4. Where the levels are below a level to be determined according to the provisions referred to in Article 4 (5), the sole use of modelling or objective estimation techniques for assessing levels shall be possible. This provision shall not apply to agglomerations in the case of pollutants for which alert thresholds have been fixed according to the provisions referred to in Article 4 (5).
	Ordinance № 2/19.02.1998 for limited values (concentrations in waste gases) of harmful substances emitted in the ambient air from stationary sources	SG № 51 of 06/05/1998 SG № 19 of 08/03/2011	The ordinance states that the aim is to keep emission values low to prevent or reduce emissions of harmful substances into the air from stationary sources.
	Ordinance № 16/12.08.1999 of the emission of volatile organic compounds from storage, loading or unloading and transport of petrol	№ 16 (SG № 75 of 24/08/1999) SG № 33 of 27/04/2012	This Regulation sets the requirements for limited emissions of volatile organic compounds.
	Directive of the European Parliament and of the Council relating to the assessment and management of environmental noise - Protection from Environmental Noise Act	2002/49/EC SG № 74 of 13/09/2005 SG № 41 of 02/06/2009	Chapters of importance are: Chapter 2: 1. Previous, current and future noise conditions; 2. Exceedance of the limit values of the noise indicators; 3. Type and location of the items with the regulated noise characteristics; and 4. Number of the population in the area subject to noise

Topic Covered	Legislation	Legislation Number and Date	Relevance to Project
			impact. Chapter 5: 1. Control on the sources of environmental noise; and 2. Control on the execution of the conditions set in the ESIA permit.
	Directive of the European Parliament and of the Council relating to the assessment and management of environmental noise - Ordinance № 6 on noise indicators, limit values of the noise indicators, assessment methods for environmental noise indicators, as well as assessment methods related to the negative impact on human's health	2002/49/EC SG № 58 of 18/07/2006	This ordinance covers: 1. Environmental Noise Indicators; 2. Limit values / norms; and 3. Assessment methods.
	Directive on the approximation of the laws of the Member States relating to the noise emission in the environment by equipment for use outdoors - Ordinance on the requirements and the evaluation of the compatibility of the machines and equipment for use outdoors as regards the noise emitted in the ambient air	2000/14/EC SG № 11 of 10/02/2004 SG № 37 of 08/05/2007	This ordinance: 1. Determines the machines and equipment for use outdoors; and 2. Specifies the permissible levels of sound power of machines and equipment for use outdoors.
	Ordinance № 6 on the emission standards for permissible levels of harmful and dangerous substances in wastewater discharged in water bodies	2006/11/EC SG № 97 of 28/11/2000 SG № 24 of 23/03/2004	This ordinance sets out the limit Values for Admissible Contents of Dangerous and Harmful Substances in the Wastewater Discharged in the Water Bodies.
Waste	The state policy on waste management is a modern resource efficiency concept aiming to prevent waste, promote reuse through recycling, regeneration or other process of extracting secondary raw materials, provide safe disposal and storage of waste, increase producers' responsibility, stimulate investment in the sector, within the available financial instruments.		

Topic Covered	Legislation	Legislation Number and Date	Relevance to Project

The policy on waste management is carried out by the Ministry of Environment and Water, assisted by Directorate Waste management and soil protection, in accordance with EU and national legislation – Environment Protection Act, Waste Management Act, regulations, national planning and strategic documents – National Plan for Waste Management 2014-2020, National Strategic Plan for Urban Wastewater Treatment Plants Sludge Management 2014-2020, National Strategic Plan for Construction and Demolition Waste Management 2011-2020 and National Strategic Plan for Gradual Reduction of Biodegradable Waste.

In the context of European Commission waste policy and the development of circular economy, the linear economic model of the type "get, produce and dispose" no longer corresponds to the needs of modern society and the limited nature of natural resources. According to the accepted hierarchy of waste priority is given to waste prevention, followed by preparation for reuse, recycling, recovery and finally disposal, being the most undesirable option.

In this sense, the state policy on waste management is focused on the integration of new, sustainable from environmental and economic point of view models where everything that can be utilized and recycled from household waste is separated to be transformed into energy, raw material for the industry, fertilizer for the plants and only minimal amounts of waste are disposed at the newly built regional landfills.

By legislative and non-legislative initiatives, the policies of the Ministry are consistent with the policies at European level and the key aspects of the national interest to achieve a 65% recycling of household waste by 2030, 75 % recycling of packaging waste by 2030 and 10% maximum landfill disposal by 2030 as described below

International legislation

EU WASTE FRAMEWORK DIRECTIVE

The Waste Framework Directive (2008/98/EC), and subsequent amendments including Directive 2018/851, provides a comprehensive foundation for the management of waste across the European Community. The objective of the Directive is to improve waste management with a focus on sustainable material management. This should be undertaken with "*a view to protecting, preserving and improving the quality of the environment, protecting human health, ensuring prudent, efficient and rational utilisation of natural resources, promoting the principles of the circular economy, enhancing the use of renewable energy, increasing energy efficiency, reducing the dependence of the Union on imported resources, providing new economic opportunities and contributing to long-term competitiveness*".

The following articles within the Directive are of relevance to the Project within the scope of this chapter:

Topic Covered	Legislation	Legislation Number and Date	Relevance to Project

▪ Article 3 defines waste as: "any substance or object that the holder discards or intends or is required to discard". It is important to note that the definition of 'discard' set out in the Waste Framework Directive includes any substance or object that is discarded for disposal or that has not been subject to acceptable recovery (including recycling); and
▪ Article 4 defines the elements of the Waste Hierarchy (Figure below):

The main principles of the Waste Hierarchy are:

• Prevention: using less material in design and manufacture; keeping products for longer; re

use; using less hazardous materials;

The first option is to prevent the production of waste by choosing, from the design phase, the best technologies. It is not always possible to avoid the production of waste. Measures must be taken to minimize the amount of waste generated. This will be done through reuse, recycling and energy recovery as well as through the selective collection of waste in order to recover it.

Reducing the amount of waste is also achieved through the efficient use of resources, monitoring the flow of materials used and results, training employees to comply with the legal provisions in the field, establishing a construction waste recycling program and identifying companies specialized in the transport, disposal and waste recycling.

- Preparing for reuse: checking, cleaning, repairing, refurbishing, whole items or spare parts;

Topic Covered	Legislation	Legislation Number and Date	Relevance to Project

• Recycling: turning waste into a new substance or product; includes composting if it meets quality protocols; Measures will be taken to reuse all recyclable waste.

• (Other types of) recovery: anaerobic digestion; incineration with energy recovery; gasification and pyrolysis which produce energy (fuels, heat and power); recovering materials from waste; some backfilling; and The operations will be carried out, the main result of which is the replacement of some materials with recovered waste.

• Disposal: landfill and incineration without energy recovery. Disposal/storage will be the last option chosen when the others have been exhausted.

▪ Article 14 identifies that responsibility for the costs of waste management shall be borne by the producer of the waste;

▪ Article 15 outlines responsibility for waste management. This includes responsibilities for the waste transfer process such as the need to ensure professional waste collection and transport results in delivery to appropriate treatment installations;

▪ Article 17 sets out measures for the control of hazardous waste. Obligations to ensure the production (i.e. generating), collection and transportation of hazardous waste, as well as its storage and treatment, are carried out in conditions providing protection for the environment and health;

▪ Article 18 outlines that hazardous waste must not be mixed with non-hazardous waste, with the exception that if a Best Available Technique (BAT) is applied at permitted facilities.

National legislation

Waste Management Act	2006/12/EC SG № 86 of 30/09/2003 SG № 36 of 26/04/2011	This directive: 1. Specifies the base conditions in waste management and determinate the different type of waste; 2. Covers obligations of parties engaged in activities related to waste; and 3. Covers control over the waste management.
Ordinance № 3 on the classification of wastes	2000/532/EC SG № 44 of 25/05/2004	This ordinance covers: 1. Terms for waste classification, including toxic waste; and 2. Registration of each type of waste / obligations of the waste owner.
Ordinance on the packaging and	94/62/EC	This ordinance covers:

Topic Covered	Legislation	Legislation Number and Date	Relevance to Project
	packaging waste	SG № 19 of 09/05/2004 SG № 29 of 08/04/2011	1. Give general information for organizing the separate collection of waste; 2. Specifies the right way for disposal of packaging waste and the necessary requirements for performing of collection, transportation, separation and utilization of packaging waste.
	Ordinance on the requirements for production and launch to market of batteries and accumulators, and for treatment and transportation of waste batteries and accumulators	2006/66/EC SG № 58 of 15/07/2005 SG № 29 of 08/04/2011	This ordinance specifies the conditions for storage and handling of used batteries.
	Ordinance on the requirements for marketing of electrical and electronic equipment and treatment and transportation of waste electrical and electronic equipment	2002/96/EC SG № 36 of 02/05/2006 SG № 29 of 08/04/2011	This ordinance specifies all conditions and requirements in collection, storage, handling and transportation of waste electrical and electronic equipment.
	Ordinance on the treatment and transportation of industrial and other hazardous waste	2008/98/EO SG № 29 of 1999	This ordinance: 1. Determines the general conditions for handling of industrial and hazardous waste; 2. Determines the requirements in collection, adoption and temporary storage of industrial and hazardous waste; and 3. Specifies the conditions in transportation of industrial and hazardous waste, including transport documentation and requirements to the transport vehicle.
	Ordinance on the requirements for treatment and transportation of processed lubricants and waste oil products	75/439/EIO & 2008/98/EO SG № 90 of 11 /11/2005 SG № 29 of 08/04/2011	This ordinance: 1. Specifies the prohibition on waste oil disposal to surface and ground water and soil; 2. Requires contract to be made with licensed waste oil treatment company, holding valid waste management permit under Waste Management Act; and 3. Specifies the requirements for handling of waste oils - temporary storage facilities and transportation condition and documentation.
Water	Water Act	2008/105/EC	This law covers the ownership and water management on the

Topic Covered	Legislation	Legislation Number and Date	Relevance to Project
		SG № 67 of 1999 SG № 80 of 14/10/2011	territory of the Republic of Bulgaria as a national indivisible natural resource and the ownership of the water economic systems and facilities; summary of the permits: the issued permit regulates water management, usage and protection.
	Ordinance № 13 on the characterization of surface water	2008/105/EC SG № 37 of 08/05/2007 SG № 80 of 14/10/2011	This ordinance covers the characterization of surface water.
Soils	Soil Act	2004/35/CE SG № 89 of 06/11/2007 SG № 98 of 14/12/2010	Under Article 2; this act discusses: 1. Prevention of soil deterioration and the damages; 2. Conservation of the soil;
	Ordinance № 3 on the limit values of hazardous substances in the soil	№ 3 (SG № 71 of 12/08/2008)	The norms for the permissible limits of harmful substances in the soils are determined on the basis of the risk assessment for the environment and the human health at three levels (presented in the impact assessment chapter): 1. Low assessment concentrations; 2. Maximal permissible concentrations; and 3. Interventional concentrations.
Noise	The Noise Level Guidelines (IFC, WHO) refer to noise originating from facilities as well as stationary noise sources and are commonly applied as design standards for industrial and infrastructure facilities. <u>National Legislation:</u> • Ordinance No. 6 of 26.06.2006 on the environmental noise indicators, considering the degree of discomfort during the different parts of the day, the limit values of the environmental noise		

Topic Covered	Legislation	Legislation Number and Date	Relevance to Project
	indicators, the assessment methods of the noise indicator`s values and the harmful effects of noise on public health, Issued by the Minister of Health and the Minister of Environment and Water, prom. SG 58 of 18.07.2006 • Ordinance No. 54 of 13.12.2010 on the activities of the national system for environmental noise monitoring and on the requirements for conducting self-monitoring and provision of information from industrial sources of environmental noise, Issued by the Minister of Health and the Minister of Environment and Water, prom. SG 3 of 11.01.2011, entering into force on 12.02.2011		
	IFC Noise Level Guidelines[14][15]		

[14] https://www.ifc.org/content/dam/ifc/doc/2023/ifc-general-ehs-guidelines.pdf

[15] Guidelines values are for noise levels measured out of doors. Source: Guidelines for Community Noise, World Health Organization (WHO), 1999.

Topic Covered	Legislation	Legislation Number and Date	Relevance to Project

Type of Receptor	Daytime 07:00 – 22:00 1-hr LAeq (dBA)	Night-time 22:00 – 07:00 1-hr LAeq (dBA)
Residential institutional or educational[16]	55	45
Industrial or commercial	70	70

In line with the approach of the IFC, if changes in background noise as a result of noise emissions from the plant are no greater than 3 dBA then noise impacts are not deemed to be significant.

[16] For acceptable indoor noise levels for residential, institutional, and educational settings refer to WHO (1999).

4.4. International conventions (including labour conventions)

Relevant international conventions ratified by Bulgaria are summarised in Table 10 below.

Table 10. Relevant international conventions

Convention name	Applicability to the Project
ENVIRONMENT / CLIMATE CHANGE	
United Nations Framework Convention on Climate Change (UNFCC) (New York, 1992) (Official Gazette of RM no. 61/97) including Paris Agreement (joined April 2017)	Addressed in relation to physical climate impacts
Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (12/22/1995)	Considered in relation to the adequacy of in-country facilities to manage disposal of hazardous wastes and electrical wastes e.g. PV panels.
Convention Concerning the Protection of the World's Cultural and Natural Heritage (ratified 1993)	Project construction may cause damage or disturbance to irreplaceable sites (areas of archaeological or historic interest to local communities, features, or practices of tangible or intangible cultural heritage value.
Convention for the Safeguarding of the Intangible Cultural Heritage. Paris (ratified 2008)	Project construction may cause damage or disturbance to irreplaceable sites (areas of archaeological or historic interest to local communities, features, or practices of tangible or intangible cultural heritage value.
Convention on International Trade (CITES) in Endangered Species of Wild Fauna and Flora (07/01/1997)	Project site clearance may result in certain CITES species being exposed to risk of trade or poaching.
Convention on the Conservation of the Migratory Species of Wild Animals (Bonn Convention) (05/01/1998)	The siting and construction of the solar plant and related transmission lines could adversely impact protected species or their habitat directly or through habitat fragmentation
Convention on Wetlands of International Importance, especially the Waterfowl Habitats of Aquatic Birds (Ramsar Convention) (1975) (ratified 2001)	The sitting and construction of the solar plant and related transmission lines could adversely impact protected species or their habitat directly or through habitat fragmentation.
Vienna Convention for the Protection of the Ozone Layer (1985).	The Project is required to prohibit the use of certain chemicals outlined under this convention in the manufacturing and construction of the solar plan.
Montreal Protocol to Protect the Ozone Layer (including 1990 and 1999 amendments)	The Project is required to prohibit the use of certain chemicals outlined under this convention in the manufacturing and construction of the solar plan.
Convention on Access to Information, Public Participation in Decision Making and Access to Justice in Environmental Matters (Aarhus Convention) (Official Gazette of RM no. 40/99	

As a member of the International Labour Organization (ILO) since 1992, Bulgaria has ratified 101 ILO conventions, including the eight fundamental conventions listed below which are core requirements of IFC PS2. [17]

Labour Convention (Fundamental)	Date of Ratification
C029 - Forced Labour Convention, 1930 (No. 29)	22 September 1932
C087 - Freedom of Association and Protection of the Right to Organise Convention, 1948 (No. 87)	08 June 1959
C098 - Right to Organise and Collective Bargaining Convention, 1949 (No. 98)	08 June 1959
C100 - Equal Remuneration Convention, 1951 (No. 100)	07 November 1955
C105 - Abolition of Forced Labour Convention, 1957 (No. 105)	23 March 1999
C111 - Discrimination (Employment and Occupation) Convention, 1958 (No. 111)	22 Jul 1960
C138 - Minimum Age Convention, 1973 (No. 138) Minimum age specified: 15 years	23 Apr 1980
C182 - Worst Forms of Child Labour Convention, 1999 (No. 182)	28 Jul 2000

4.5. Lender requirements

The following E&S standards were considered for this assessment:

- IFC Performance Standards (2012);
- Equator Principles IV (2020);
- EU Law and Regulations relevant for the Project

4.5.1. IFC Performance standards

The Project will principally set out to comply with the requirements of the IFC Performance Standards 2012 (IFC PSs), including:

- Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts.
- Performance Standard 2: Labour and Working Conditions
- Performance Standard 3: Resource Efficiency and Pollution Prevention.
- Performance Standard 4: Community Health, Safety, and Security.
- Performance Standard 5: Land Acquisition and Involuntary Resettlement (OHTL only).

[17] Source:https://www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:11200:0::NO::P11200_COUNTRY_ID:102576

- Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources.

The following PSs are not triggered for this Project (as described in subsequent sections).

- Performance Standard 8: Cultural Heritage [18] (to be finally confirmed following final consultation with relevant archaeological stakeholders)
- Performance Standard 7: Indigenous Peoples.

IFC PS1 establishes the importance of: (i) integrated assessment to identify the social and environmental impacts, risks, and opportunities of projects; (ii) effective community engagement through disclosure of project-related information and consultation with local communities on matters that directly affect them; and (iii) management of social and environmental performance throughout the life of the project.

IFC PS2 through IFC PS8 establish requirements to avoid, reduce, mitigate or compensate for impacts on people and the environment and to improve conditions where appropriate. While all relevant social and environmental risks and potential impacts should be considered as part of the assessment, IFC PS2 through IFC PS8 describe potential social and environmental impacts that require particular attention in emerging economies and sensitive and critical natural and human environments. Where social or environmental impacts are anticipated, they are to be managed through an Environmental and Social Management System (ESMS) consistent with the requirements of IFC PS1.

IFC PS3 refers to the World Bank Group (WBG) Environment, Health and Safety (EHS) Guidelines. These guidelines are the technical reference documents for environmental protection and set out specific examples of good international industry practice (GIIP). The General EHS Guidelines contain information on crosscutting issues applicable to projects in all industry sectors, including geothermal. They guide performance levels and measurements considered achievable at a reasonable cost by new or existing projects using existing technologies and practices. This Project is expected to comply with standards and guidelines identified in the General EHS Guidelines alongside host country requirements.

The Project is expected to be assigned a Category B under potential IFC Environmental and Social Policy i.e., *"Business activities with potential limited adverse environmental or social risks and/or impacts that are few in number, generally site-specific, largely reversible, and readily addressed through mitigation measures".*

4.5.1. World Bank Group guidelines

The WBG EHS Guidelines applicable to the Project are listed as follows:

- WBG General EHS Guidelines (April 2007) - cover the four areas of the environment; occupational health & safety (OHS); community health & safety (CHS); construction and decommissioning; and

[18] PS8 is not expected to be triggered

- WBG EHS Guidelines Electric Power Transmission and Distribution (April 2007).

4.6. Project standards

The following Project standards are applicable to the Project (PV and OHTL)

Typically, for construction, noise criteria of 70 dB LAeq, 1-hr are set to take account of the fact that it is temporary, and to acknowledge that construction work by its very nature is noisy and a lower, strictly enforced criteria, can limit development.

The Noise Level Guidelines (IFC, WHO) refer to noise originating from facilities as well as stationary noise sources and are commonly applied as design standards for industrial and infrastructure facilities.

National Legislation:

- Ordinance No. 6 of 26.06.2006 on the environmental noise indicators, considering the degree of discomfort during the different parts of the day, the limit values of the environmental noise indicators, the assessment methods of the noise indicator`s values and the harmful effects of noise on public health, Issued by the Minister of Health and the Minister of Environment and Water, prom. SG 58 of 18.07.2006
- Ordinance No. 54 of 13.12.2010 on the activities of the national system for environmental noise monitoring and on the requirements for conducting self-monitoring and provision of information from industrial sources of environmental noise, Issued by the Minister of Health and the Minister of Environment and Water, prom. SG 3 of 11.01.2011, entering into force on 12.02.2011

Lender standards

The World Bank Group (WB) has developed a thorough programme of noise pollution prevention and management techniques in order to ensure that projects funded by the organisation are environmentally and socially responsible. The IFC in tis EHS guidelines sets out noise limit values as provided in

Table 11.

Table 11: IFC Noise Limit Values[19],[20]

Type of Receptor	Daytime 07:00 – 22:00 1-hr LAeq (dBA)	Night-time 22:00 – 07:00 1-hr LAeq (dBA)
Residential institutional or educational[21]	55	45

In line with the approach of the IFC, if changes in background noise as a result of noise emissions from the plant are no greater than 3 dBA then noise impacts are not deemed to be significant.

4.7. Good International Industry Practice

Good International Industry Practice (GIIP) is the exercise of professional skill, diligence, prudence and foresight that would reasonably be expected from skilled and experienced professionals engaged in the same type of undertaking under the same or similar circumstances globally or regionally. These are referenced in the mitigation sections where relevant:

- World Bank, Utility-Scale Solar Photovoltaic Power Plants. A Project Developer's Guide (2015)
- Solar Construction Safety Manual - https://www.coshnetwork.org/sites/default/files/OSEIA_Solar_Safety_12-06.pdf
- EBRD Eligibility Criteria for Solar Projects. Available at https://www.ebrd.com/who-we-are/our-values/environmental-emanual-risk.html
- PRI Managing ESG Risk in the Supply Chains of Private Companies. Available at: www.unpri.org/download?ac=1894 Voluntary Principles on Security and Human Rights (est. 2000); (http://www.voluntaryprinciples.org/).
- United Nations Guiding Principles for "Protect, Respect and Remedy" Human Rights Framework (2011); (https://www.business-humanrights.org/en/un-secretary-generals-special-representative-on-business-human-rights/un-protect-respect-and-remedy-framework-and-guiding-principles).
- United Nations Code of Conduct for Law Enforcement Officials; and (https://www.un.org/ruleoflaw/blog/document/code-of-conduct-for-law-enforcement-officials/).
- United Nations Basic Principles on the Use of Force and Firearms by Law.
- Use of Security Forces: Assessing and Managing Risks and Impacts (February 2017).
- Worker's Accommodation: Processes and Standards (Guidance Note by IFC and EBRD,

[19] https://www.ifc.org/content/dam/ifc/doc/2023/ifc-general-ehs-guidelines.pdf

[20] Guidelines values are for noise levels measured out of doors. Source: Guidelines for Community Noise, World Health Organization (WHO), 1999.

[21] For acceptable indoor noise levels for residential, institutional, and educational settings refer to WHO (1999).

2009).

- Stakeholder Engagement: A Good Practice Handbook for Companies Doing Business in Emerging Markets, 2007.
- World Bank (2016a). Managing the Risks of Adverse Impacts on Communities from Temporary Project Induced Labor Influx. The World Bank, Washington, D.C.
- British Standard (BS) 5228: Code of Practice for Noise and Vibration Control - BS 5228

4.8. Climate Policy

The European Union (EU) aims to be a global leader in the fight against climate change and is therefore striving to achieve the targets set in Paris Agreement reached by the Conference of the Parties (COP 21) to the United Nations Framework Convention on Climate Change while simultaneously ensuring clean energy across the Union. In order to fulfil this commitment, the Union has set the following binding targets for climate and energy to be achieved by 2030:

- reducing greenhouse gas emissions (GHG) by at least 40 % compared with 1990;
- increasing energy efficiency (EE) to at least 32.5 %;
- increasing the share of energy from renewable sources (RS) in gross final energy consumption in the EU to at least 32 %;
- ensuring a level of electricity interconnection between Member States equivalent to at least 15 %.

In order to ensure a co-ordinated and concerted approach across the Union and implementation of the European Union Energy Strategy, each Member State (MS) was required to submit to the European Commission its draft Integrated National Energy and Climate Plan (INECP) by 31 December 2018 and its final Integrated Plan by 31 December 2019. [22]Bulgaria's Integrated National Climate and Energy Plan has set the following objectives:

- promoting low-carbon economic development;
- developing a competitive and secure energy sector;
- reducing dependence on fuel and energy imports;
- ensuring that energy is available at affordable prices to all consumers.

4.9. GBVH national legislation

Bulgarian legislation does not provide for a legal definition of violence against women (VAW), neither for a definition of gender-based violence (GBV) in general. Definitions on some of the forms of VAW: domestic violence/intimate partner violence, rape, debauchery, sexual assault, sexual harassment and trafficking of human beings are regulated by different laws.

The definition of domestic violence which includes intimate partner violence is given by the Law on Protection against Domestic Violence /LPADV/ of March 2005 (amended in 2009, 2010 and

[22] Integrated Energy and Climate Plan of the Republic of Bulgaria 2021–2030

2015), which defines domestic violence and provides for measures for protection against it, as well as measures for help and support for the victims.

Debauchery and rape are defined by the Penal Code of April 1968 (last amended in September 2015). No specific provisions in the Penal Code criminalising marital rape. The Law on Protection against Discrimination of January 2004, as amended in August 2012, defines sexual harassment and explicitly recognises sexual harassment as a form of discrimination. Stalking is not regulated by Bulgarian national law. Instead, Bulgarian legislation regulates harassment.

The Penal Code criminalises human trafficking under offences against the person. The Combating Trafficking in Human Beings Act (CTHBA) introduces measures for the prevention and protection of human trafficking victims.

There are no special legislative measures encouraging private companies to be involved in the prevention, protection and reintegration of victims of VAW outside the workplace.

The Law on Protection Against Discrimination (Art.17) provides for protection measures against sexual harassment in the workplace, and regulates that employers must hold inquiries regarding complaints and take measures to stop the harassment.

Bulgaria has signed and ratified the Convention on the Elimination of all Forms of Discrimination Against Women. •As an EU Member State since 2007, Bulgaria has absorbed European legislation into their national legislation, ratifying 100 of the ILO conventions (of which 63 are in force), including the eight fundamental conventions. These include (among others) the elimination of discrimination against women; civil & political rights; against torture and other cruel inhuman or degrading treatment; economic, social and cultural rights; the protection of the rights of all migrant workers and families; the rights of the child; and the rights of persons with disabilities.

5. ESIA APPROACH, METHODOLOGY AND STAKEHOLDER ENGAGEMENT

5.1. Overview of Area of Influence

The area of influence (AOI) is defined by where Project impacts may be felt or observed, e.g., the zone of visual impact or the distance from the working area where noise or air quality impacts may be identified.

The Project direct AOI often varies depending on the specific environmental or social aspect considered based on the extent an impact may be affected and can be influenced on a spatial and temporal level. Topic specific AOI are described in the individual impact assessment sections below and have been informed by GIIP, outcomes of the scoping process. This includes the social AOI.

The indirect AOI area is defined as where secondary or induced benefits or impacts may be realized, including employment impacts or impacts from an influx of workers or indirect project impacts on biodiversity or on ecosystem services[23] upon which Affected Communities' livelihoods are dependent. The AOI includes all associated facilities that will be constructed or expanded in relation to the project (i.e. overhead lines routes)

5.2. ESIA terms of reference

A scoping process was undertaken at the outset of the ESIA to identify the issues and impacts to be addressed. A project AOI of 10km was considered for the scoping work. The topics identified by the scoping process for further assessment in the ESIA are summarised in Table 12 (PV Project) and (OHTL Project). The explanation for scoping in or out certain topics is described in the scoping table provided in Annex A to this ESIA.

Table 12: ESIA terms of reference (TOR) - PV Project

Environment and Health	Social	Labour
Scoped in:		
· Air quality (C/D). · Noise and vibration (C,O.D) · Waste (including hazardous waste) (C/O/D) · Soil (C/D) · Water resource use (C,O,D)© · Hydrogeology (C/D) · Biodiversity (C,D) · Ecosystem services (C,O,D) (scoped in but addressed under livelihood and resources use and other topic areas)	· Community health and safety (C/O/D) · Traffic and Transportation (C/D) · Security (C/O/D) · Emergency preparedness and response (C/O/D) (community risks) · Cultural heritage (tangible) (C) · EMF/EMC (O)	· Occupational Health and Safety (C/O/D) · Emergency preparedness and response (C/O/D) · Labor rights (C/O/D) · Employment (positive) (C/O/D) · Procurement/supply chain (C/O/D) · Gender Based Violence and Harassment (GBVH) (C/D) · Human rights (C/D)

[23] Ecosystem services is the term used to describe elements of the natural environment that can provide benefits to people e.g. water, raw materials, regulation of climate or flooding, cultural benefits, recreational benefits, food (IES, October 2013, Ecosystem Services assessment: how to do one in practice).

Environment and Health	Social	Labour
· Landscape and visual impact (O)		· Temporary labour influx (C/D)
Scoped out:		
· Air quality (O) · Landscape and visual impact (C, D) · Soils (O) · Greenhouse gases (C/O/D) · Climate resilience · Cumulative impacts (O) · Transboundary impacts (C/O/D) · Cumulative impacts (C)	· Livelihood and land use · Radio and TV interference (C/O/D) · Traffic and transportation (O) · Cultural heritage (O) · Indigenous Peoples (C/O/D) · Biodiversity (O) · Cultural heritage (intangible)	· Temporary labour influx (O) · Human rights (O) ·
Note: C = Construction, O = Operations, D = Decommissioning		

Source: Scoping Table (ESIA Annex A)

Table 13: ESIA terms of reference (TOR) - OHTL

Environment and Health	Social	Labour
Scoped in:		
· Air quality (C/D). · Noise and vibration (C/D) · Waste (including hazardous waste) (C/O/D) · Soil and (C/D) · Biodiversity (C,D) · Landscape and visual impact (C, O, D) ·	· Community health and safety (C/O/D) · Traffic and Transportation (C/D) · Security (C/D) · Livelihood and land use (C) · Cultural heritage (C) · Emergency preparedness and response (C/O/D) (community risks) · EMF/EMC (O)	· Occupational Health and Safety (C/O/D) · Emergency preparedness and response (C/O/D) · Labor rights (C/O/D) · Employment (positive) (C/O/D) · Procurement/supply chain (C/O/D) · Gender Based Violence and Harassment (GBVH) (C/D) · Human rights (C/D) · Temporary labour influx (C/D) ·
Scoped out:		
· Air quality (O) · Noise (O) · Soils (O) · Water resources (C/D). · Hydrogeology (C/D) · Cumulative impacts (C) · Climate resilience · Greenhouse gases (C/O/D) · Cumulative impacts (O) · Transboundary impacts (C/O/D) · Security (O)	· Radio and TV interference (C/O/D) · Traffic and transportation (O) · Cultural heritage (O) · Indigenous Peoples (C/O/D) · Biodiversity (O)	· Gender Based Violence and Harassment (GBVH) (O) · Human rights (O) · Temporary labour influx (O)
Note: C = Construction, O = Operations, D = Decommissioning		

Source: Scoping Table (ESIA Annex A)

5.3. ESIA methodology

5.3.1. Approach to Assessment of Impacts

The adverse and beneficial E&S impacts for the construction, operation and decommissioning phases (as scoped into the ESIA, see Appendix A) have been identified and assessed against the established baseline.

A consistent approach to the assessment of impacts was followed to enable environmental and social impacts to be broadly compared across the ESIA. A set of generic criteria were used to determine significance (see below) which were applied across the various E&S aspects.

As far as possible, environmental and social impacts were quantified. Where it was not possible

to quantify impacts, a qualitative assessment was conducted using professional experience, judgment and available knowledge, and including the consideration of stakeholder views. Where there were limitations to the data, and/or uncertainties, these have been recorded in the relevant chapters, along with any assumptions that were taken during the assessment. In order to determine the significance of each impact, two overall factors are considered:

- The importance and/or sensitivity of the E&S receiving parameter, as determined during the assessment of baseline conditions; and
- Magnitude and nature of the impact.

5.3.1.1. Sensitivity of the Receiving Parameter

A receptor is an entity that may be affected by direct or indirect changes to a social or environmental variable. General information about receptors in the Project area is presented in section 2. For each topic specific impact assessment, the relevant receptor sensitivity was determined using information taken from the baseline description on the importance, significance or value of the social or environmental component under examination. Part of this consideration includes considering the sensitivity of the receiving parameter, as this is a measure of the adaptability and resilience of an environmental parameter to an identified impact or its importance to the local or wider community, its ecosystem function or its economic value.

The following categories of sensitivity were applied to the assessment:

- High: The environmental parameter/receptor is fragile, and an impact is likely to leave it in an altered state from which recovery would be difficult or impossible.
- Medium: The parameter/receptor has a degree of adaptability and resilience and is likely to cope with the changes caused by an impact, although there may be some residual modification as a result; and
- Low: The parameter/receptor is adaptable and is resilient to change.

5.3.1.2. Magnitude and Nature of the Impact

The magnitude of the impact is the scale of change which the impact may cause compared to the baseline and how this change relates to accepted thresholds and standards. The following categories were applied to the assessment:

- High: a large change compared to variations in the baseline. Potentially a clear breach of accepted limits; A high magnitude impact may also adversely affect the integrity of a site, habitat or ecosystem.
- Medium: change which may be noticeable and may breach accepted limits; A moderate magnitude impact may also affect the ecological functioning of a site, habitat or ecosystem but without adversely affecting its overall integrity. The area affected may be local or regional.
- Low: when compared with the baseline, change which may only just be noticeable. Existing thresholds would not be exceeded.

- Negligible Magnitude Impact: affects a very small specific area, system, aspect (physical), group of localised individuals within a population (biological) at such a rate that can be deemed to be unimportant or insignificant.

Furthermore, in determining the magnitude of the impact it is important to consider and consider several other factors which define the nature of the impact. This includes the following:

Type of Impact

- Positive: applies to impacts that have a beneficial environmental or social result, such as enhancement of the existing environmental conditions; and
- Negative: applies to impacts that have a harmful aspect associated with them such as loss or degradation of environmental resources.

Type of Effect

- Direct: applies to impacts which can be clearly and directly attributed to a particular environmental or social parameter (e.g. generation of dust directly impacts air quality); and
- Indirect: applies to impacts which may be associated with or are subsequent to a particular impact on a certain environmental or social parameter (e.g. high levels of dust could entail nuisance and health affects to construction workers onsite).

Duration (how long the stressor or its effect last)

- Short Term: applies to impacts whose effects on the environment will disappear within a 1-year period, or once construction activities are completed;
- Medium Term: applies to impacts whose effects on the environment will disappear within a 5-year period; and
- Long Term: applies to impacts whose effects on the environment will disappear in a period greater than 5 years.

Extent

- Local: - limited impact in the project area and its surroundings
- Regional: impacts felt beyond the local areas, even in the extended region
- Global: - impacts felt at the international level, thus affecting another country

Frequency

- Temporary: short-term impacts, on the order of hours to weeks.
- Permanent: impacts causing a permanent change on the receiver or the affected resource (s) and extending well beyond the lifetime of the project

Likelihood

- Unlikely to occur: These are impacts that have a very low chance of occurring now or in the future
- Possible: event likely to occur at some point during the project

- Likely to occur: These are impacts that are very likely to occur e.g. dust raising due to site clearance

Reversibility

- Reversible: applies to impacts whose significance will be reduced and disappeared over time (either naturally or artificially), once the impacting activity ceases; and
- Irreversible: applies to impacts whose significance will not be reduced nor disappeared over time (either naturally or artificially) once the impacting activity ceases.

5.3.1.3. Assessing the Significance of the Impacts

The concept of 'significance' is central to the ESIA process and aids the identification and categorization of E&S effects. As noted, in order to determine impact significance, the sensitivity of each E&S parameter/receptor is considered in combination with the magnitude of the impact.

Table 14 below demonstrates how these parameters are considered in the assessment of significance.

Table 14: Significance of the Impacts

Sensitivity of Receiving Parameter/Receptor	Magnitude and Nature of Impact			
	Negligible	Low	Medium	High
Low	Negligible	Negligible	Minor	Moderate
Medium	Negligible	Minor	Moderate	Major
High	Negligible	Moderate	Major	Major

While the above matrix provides a framework for the determination of significance, and enables comparison across E&S parameters, a degree of professional judgement must be used and some parameter-specific factors to be considered in making the determination of significance. Below provides additional guidance to the degrees of significance used in this ESIA. Note that positive impacts are defined but are not rated for significance.

- Major significance: requires thorough investigation in the ESIA. These impacts have been studied extensively by consulting expertise in the areas of the identified impacts to design needed mitigation and environmental management measures. Moreover, conducting specific studies and assessments to some of the key issues identified;
- Moderate significance: requires reasonable investigation in the ESIA. These impacts have been studied by expertise in the areas of the identified impacts to design needed mitigation and environmental management measures.
- Minor significance: must be listed, and addressed in some way, but which did not require detailed assessment in the ESIA.
- Negligible: for completeness, impacts which have been included in the assessment but determined not to be significant, are rated formally as "negligible". the predicted effect is deemed to be 'imperceptible' or is indistinguishable from natural background variations

5.3.2. Mitigation and Management measures

The ESIA will evaluate the measures required to avoid, reduce, or offset the significant adverse effects of the Project. The preferred hierarchy of mitigation is as follows:

1. Avoidance of the effect;
2. Minimise the effect;
3. Mitigate the effect; and
4. Offset and/or compensate the effect.

Where the design of the Project is unable to resolve potentially significant effects, control and management measures will be identified and outlined in corresponding topic chapters. These measures will relate to actions required to meeting existing legislative requirements will be actions considered to be standard best practice to manage identified effects and developed with reference to national, lender and GIIP outlined in chapter 4. Based on the impact assessment undertaken a set of management measures are identified for each impact which aims to address it. Management measures may include the following:

- Additional Requirements: those are generally regulatory requirements which have been identified and which must be considered at a later stage.
- Additional Studies: for certain environmental/social receptors additional studies must be undertaken at a later stage. Such studies and their scope, timing, etc. have been highlighted were relevant.
- Mitigation Measures: a vital step in the ESIA process is the identification of measures that can be taken to ensure that impacts are mitigated or reduced to acceptable levels.
- Recommendations: for positive impacts, it is not possible to identify mitigation measures, but rather recommendations have been identified which aim to enhance the positive impact.

5.3.3. Residual Impacts

If there are mitigation measures it is then necessary to assess the 'residual significance' after mitigation has been taken account. A re-assessment of Project impacts is then made, considering the effect of the proposed mitigation measures in order to determine the significance of the residual effects. Residual effects are discussed for each E&S topic.

5.3.4. Cumulative impact assessment

The scoping assessment did not identify any neighbouring projects in the region and based on currently available information there is no information about the plans. For the avoidance of doubt, this ESIA covers phase 1 and phase 2 as one project. No further phases are planned at this time. The ESIA also assumes that the tow OHTL will be built concurrently, although this is not confirmed at this time. Cumulative impacts are scoped out and not considered further.

5.4. Stakeholder engagement

5.4.1. Overview

A stakeholder is defined as any individual or group who is potentially affected by the proposed Project or can themselves affect the proposed Project directly or indirectly. Stakeholder consultation is an inclusive process for sharing information that enables stakeholders to understand the risks, impacts, and opportunities of a development or Project, allowing them to express their views and articulate their perceptions towards it. Stakeholder engagement is required to be an integral part of ESIA good practice. The Project Company is committed to a technically and culturally appropriate approach to consultation and engagement with all stakeholders affected either directly or indirectly by the Project. To assist this process, a separate Stakeholder Engagement Plan (SEP) (Volume III) has been prepared. This is a live document that is updated and key stages of the Project implementation.

Engagement activities are ongoing process since the commencement of the Project development. This section presents a summary of the stakeholder engagement activities that have been undertaken to date in support of the Project.

5.4.2. Community Liaison Officer

The Project has appointed a community liaison officer (CLO) to coordinate stakeholder engagement activities in the Project area. The specific responsibilities of the CLO is as follows:

- Act as liaison between the community (*interested stakeholders*) and the Company; maintain a regular presence in the affected communities and engage with community members to monitor opinions, provide updates on the Project activities and ensure communication with community members and vulnerable groups.
- Lead the day-to-day implementation of the SEP and Grievance Mechanism and manage the grievance resolution process; plan the stakeholder engagement activities and ensure the Company appropriately implements them and contracted staff.
- Ensuring the grievance mechanism dissemination and training, communication, monitoring, and reporting; is responsible for verifying contractors' compliance with grievance management commitments.
- Takes an active role in identifying the needs of the community members and assists in the successful development and implementation of a Community Investment Plan for the Project.
- Produces stakeholder engagement monitoring reports and updates for the SEP accordingly.
- Liaise with the EPC CLO

The CLO will be supported by female moderators as needed for conducting gender focused key informant interviews (KII) or focus groups.

For the purpose of addressing project related gender-based violence and harassment (GBVH) grievance that may arise during the course of the Project, the Project Company will use the services of a specialist third party to administer a project level survivor centric GBVH grievance mechanism including GBVH grievance case management (informed consent, incident investigation) and identification of a survivor referral mechanism offering independence and confidentiality.

5.4.3. ESIA Stakeholder engagement

Since Project Company involvement on the Project the following categories of stakeholder engagement have been performed:

- Engagement during social perception survey (reported in the SEP)
- Formal meetings to introduce the Project to key stakeholders and interested bodies
- Public disclosure meeting / public hearing ("open day") – 09 March 2024

The objectives of the meetings and engagement held to date has been to

- Confirm relevant stakeholders.
- Familiarize the stakeholders with the latest plans relating to the Project.
- Manage expectations.
- Confirm social license to operate.
- Disclosure and dissemination of the Project's external grievance mechanism.
- Receive, record and address stakeholder grievances.
- Business correspondence and meetings via telephone.
- Disclosure of the draft ESIA findings

During the public disclosure meeting relevant project information was provided as follows. Copies of these documents are provided as Annexes to the SEP.

- Project leaflet (including grievance contact information)
- Project presentation and maps (public disclosure meeting)
- Draft version of non-technical summary (in Bulgarian) (Volume I of the ESIA disclosure package, updated post consultation)

A summarised Stakeholder Engagement Log is provided in Table 15 below. The full SE Log is provided in the SEP along with minutes of meetings, stakeholder engagement materials, photographs from stakeholder meetings, and attendance registers (where relevant).

In August 2023, a stakeholder perception survey was performed, and the outcomes are reported in Annex A of the SEP. The survey included 110 residents of the villages of Polk. Lambrinovo, Aydemir, Kalipetrovo, Prof. Ishirkovo, Smilets or Silistra as well as some landwoenres, local business owners, farmers, and government employees. When asked about the possible impact of the Project on the local community, 38% of the participants mentioned that the impact they perceive the Project will be positive, mentioning that it will probably increase the work offer for the locals, will bring more funds to the local administration budget, and will help the overall

development of the settlement. Furthermore, during the discussions, the participants mentioned the increase in the quality of life in the area, given by the future new investments and the new roads that will be created due to the Project. 32% had no opinion and 20% perceived a negative impact citing impacts on agricultural activity as a key concern as well a potential biodiversity impacts due to the duration of the Project.

Issues and concerns raised during the ESIA consultation are summarised in Table 16 alongside information as to how the Project has or intends to respond to these issues and concerns. We note that there are

The following photographs are taken from the community open day and other meetings.

Figure 17: Photographs from stakeholder engagement events during ESIA process

a) Meeting with local officials

b) Open day and Public disclosure/hearing

c) Open day and Public disclosure/hearing

d) Open day and Public disclosure/hearing

Table 15: Stakeholder Engagement Log (summary) (up to 29 June 2024)

Meeting Details			Stakeholder Details			Meeting Summary	Follow up Actions
No.	Record type *pick from drop-down*	Date *dd/mm/yyyy*	Key Stakeholder Name *Free text*	Role *free text*	Key Stakeholder Group *pick from drop-down*	Meeting summary / Key issues raised	Action *free text*
RESGMTG001	Socio-economic surveys	01/08/2023	Community - 10 persons (3 women) including residents, employees of company in the area,	n/a	Community/village member	During one to one meetings to introduce the project and gather socio-economic information, the following points were raised: 1. Mixture of positive and negative points raised. 2. Concern for the destruction of agricultural activity 3. Noise concerns	Follow up on concerns around noise and agricultural productivity (livelihood issues) in ESIA
RESGMTG001	Socio-economic surveys	01/08/2023	Community - 19 persons (8 women) including residents, employees of company in the area,	n/a	Community/village member	During one to one meetings to introduce the project and gather socio-economic information, the following points were raised: 1. Mixture of positive and negative points raised. 2. Concern for the destruction of agricultural activity 3. Noise concerns	Follow up on concerns around noise and agricultural productivity (livelihood issues) in ESIA

Meeting Details			Stakeholder Details			Meeting Summary	Follow up Actions
No.	Record type *pick from drop-down*	Date *dd/mm/yyyy*	Key Stakeholder Name *Free text*	Role *free text*	Key Stakeholder Group *pick from drop-down*	Meeting summary / Key issues raised	Action *free text*
RESGMTG001	Socio-economic surveys	01/08/2023	Community - 31 persons (11 women) including residents, employees of company in the area,	n/a	Community/village member	During one to one meetings to introduce the project and gather socio-economic information, the following points were raised: 1. Mixture of positive and negative points raised. 2. Concern for the destruction of agricultural activity 3. Noise concerns	Follow up on concerns around noise and agricultural productivity (livelihood issues) in ESIA
RESGMTG001	Socio-economic surveys	01/08/2023	Community - 18 persons (9 women) including residents, employees of company in the area,	n/a	Community/village member	During one to one meetings to introduce the project and gather socio-economic information, the following points were raised: 1. Mixture of positive and negative points raised. 2. Concern for the destruction of agricultural activity 3. Noise concerns	Follow up on concerns around noise and agricultural productivity (livelihood issues) in ESIA
RESGMTG001	Socio-economic surveys	01/08/2023	Community - 30 persons (12 women) including residents, employees of company in the area,	n/a	Community/village member	During one to one meetings to introduce the project and gather socio-economic information, the following points were raised: 1. Mixture of positive and negative points raised. 2. Concern for the destruction of	Follow up on concerns around noise and agricultural productivity (livelihood issues) in ESIA

Meeting Details			Stakeholder Details			Meeting Summary	Follow up Actions
No.	Record type *pick from drop-down*	Date *dd/mm/yyyy*	Key Stakeholder Name *Free text*	Role *free text*	Key Stakeholder Group *pick from drop-down*	Meeting summary / Key issues raised	Action *free text*
						agricultural activity 3. Noise concerns	
RESGMTG002	Public disclosure/hearing	09/03/2024	P. Lambrinovo and Silistra community	n/a	Community/village member	Provided project update and information about the findings of the ESIA process. Key points raised relate to historical concrete removal, hedgerow removal and noise. Full minutes of meeting provided in SEP. During the meeting the following proposals/questions were raised. 1.Discussed was the question for construction of sound barrier between the settlement and the solar park. 2.Restoration of the field protective forest belt. 3. Clearing of the construction waste, tree roots and others accumulated during the preparation of the land for the construction of the "St. Georgi" solar park. 4. Complying with all requirements	a) Record grievance in Grievance log b) Address in ESIA C) provide response to community on noise mitigation proposals (following outcomes of the noise survey and modelling)

Meeting Details			Stakeholder Details			Meeting Summary	Follow up Actions
No.	Record type *pick from drop-down*	Date *dd/mm/yyyy*	Key Stakeholder Name *Free text*	Role *free text*	Key Stakeholder Group *pick from drop-down*	Meeting summary / Key issues raised	Action *free text*
						aimed at maximum preservation of the environment, small planations, tree species, requirements related to the ornithology and plover nesting's.	
RESGMTG003	Field observation	14/03/2024	P. Lambrinovo and Silistra community	Mayor of the village Polkovnik Lambrinovo - Mr. Angel Jelev	Local Goverment (Mayors, Administrative Autority)	Dicsussed outcomes of the open day to dicsss points raised durgin the meeting relating to resptaito nof wind protection belt, road connection to the airport, contsruction of noise barrier. Mr Mayor informed us that a meeting of the villagers will take place this Saturday - 16.03.2024 and issues related to the construction of the	Record in Stakeholder Meeting Log

Meeting Details			Stakeholder Details			Meeting Summary	Follow up Actions
No.	Record type *pick from drop-down*	Date *dd/mm/yyyy*	Key Stakeholder Name *Free text*	Role *free text*	Key Stakeholder Group *pick from drop-down*	Meeting summary / Key issues raised	Action *free text*
						park will be discussed and a formal respone from hte community wil be issued.	
RESGMTG004	Informal meeting/conversation	15/03/2024	Municipality of Silistra	Chief architect of the municipalty of Silistra	Local Goverment (Mayors, Administrative Autority)	Discussed requirements for obtaining formal approval of absence of cultural heritage matters at the site and the status of documentation issued to date as part of the original permit. The chief architect expressed an opinion that it wouldnt be necessary for such an opinion to be issued since there is no excavation work on site and the transmission lines are overhead.	Record in Stakeholder Meeting Log. Follow up to confirm opinion reveived from National Institute of Immovable Cultural Heritage (NIICH),

Meeting Details			Stakeholder Details			Meeting Summary	Follow up Actions
No.	Record type *pick from drop-down*	Date *dd/mm/yyyy*	Key Stakeholder Name *Free text*	Role *free text*	Key Stakeholder Group *pick from drop-down*	Meeting summary / Key issues raised	Action *free text*
RESGMTG005	Formal Meeting	21/02/2024	Evgeni Gerorgiev	Deputy Mayor of Silistra	Local Goverment (Mayors, Administrative Autority)	After David Jackson from Rezolv Energy made an intro about Rezolv and St George project, the Deputy Mayor asked about potential support for social activities such as sport for students and youth in Silistra. Chief architect agreed to provide Rezolv with list of the land owners, key stakeholders in the project to be addressed for the Open Day. There was also a brief discussion on the disposal of demolition waste (concrete) near Coloner Lambrinovo village. The Rezolv team invited all of the municipality representatives to attend the Open day in Lambrinovo. key points raised: 4. Complying with all requirements aimed at maximum preservation of the environment, small planations, tree species, requirements related to the ornitology and plover nestings.	Chief Architect provided as agreed a list of the land owners who will be affected by the project. An offcial invitation to the Open Day was sent to the Deputy Mayor.

Meeting Details			Stakeholder Details			Meeting Summary	Follow up Actions
No.	Record type *pick from drop-down*	Date *dd/mm/yyyy*	Key Stakeholder Name *Free text*	Role *free text*	Key Stakeholder Group *pick from drop-down*	Meeting summary / Key issues raised	Action *free text*
RESGMTG006	Formal Meeting	21/02/2024	Mincho Yordanov	Regional Governor of Silistra Region	Regional Government	David Jackson from Rezolv Energy made an intro about Rezolv and St George project, the Regional Governor made a brief overview of Silistra region. The Rezolv team invited the Regional Governor and his deputy to the Open day in Lambrinovo.	An offcial invitation to the Open Day was sent to the Regional governor.

Meeting Details			Stakeholder Details			Meeting Summary	Follow up Actions
No.	Record type *pick from drop-down*	Date *dd/mm/yyyy*	Key Stakeholder Name *Free text*	Role *free text*	Key Stakeholder Group *pick from drop-down*	Meeting summary / Key issues raised	Action *free text*
RESGMTG007	Formal Meeting	21/02/2024	Angel Jelev	Mayor of Lambrinovo (end of term)	Local Goverment (Mayors, Administrative Autority)	The meeting was dominated by the issue with the un approved concrete garbage by the village by the company, which cleaned the site of the project. The Mayor expressed his and his co villagers' big concerns that the problem will not be solved. David Jackson from Rezolv pointed out despite it is not Rezolv's responsibility for the demolition waste disposal, the company will try its best to solve the issue because it is very important to the people of Lambrinovo.	None

Meeting Details			Stakeholder Details			Meeting Summary	Follow up Actions
No.	Record type *pick from drop-down*	Date *dd/mm/yyyy*	Key Stakeholder Name *Free text*	Role *free text*	Key Stakeholder Group *pick from drop-down*	Meeting summary / Key issues raised	Action *free text*
RESGMTG008	Formal Meeting	03/08/2024	Alexandar Sabanov	Mayor of Silistra	Local Goverment (Mayors, Administrative Autority)	After George Formandle from Rezolv made an introduction about Actis, Rezolv and St George project, the Mayor thanked for the investment, the biggest in Silistra for decades. Mayor Sabanov asked what number of jobs would the project bring to the town. GF asked about areas of interest to the municipality where Rezolv could help and the mayor pointed out that sport and youth are the biggest priority for the municipality. Mayor Sabanov also said that the municipality would try to help Rezolv in solving the demolition waste matter but pointed out that it is not going to be easy.	Removal of demolition waste / Follow up meetings to dicsuss employment
RESGMTG009	Formal Meeting	03/08/2024	Angel Jelev	Mayor of Lambrinovo (end of term)	Local Goverment (Mayors, Administrative Autority)	The dominant topic about thedemolition waste (concrete) and its problematic solution was dominant in the conversation between GF and AJ. GF made an introduction about Actis and Rezolv.	Removal of demolition waste

Meeting Details			Stakeholder Details			Meeting Summary	Follow up Actions
No.	Record type *pick from drop-down*	Date *dd/mm/yyyy*	Key Stakeholder Name *Free text*	Role *free text*	Key Stakeholder Group *pick from drop-down*	Meeting summary / Key issues raised	Action *free text*
RESGMTG010	Informal meeting/conversation	18/02/2024	Office of the Mayor	Mayor of Lambrinovo (new)	Local Goverment (Mayors, Administrative Autority)	Feedback on the village meeting on 16.03.2024.	Record in Stakeholder Meeting Log
RESGMTG011	Formal Meeting	22/08/2023	Energy and Water Regulator Chairman and his team	Chief Business Development Officer, Legal & Business Development Director, Corporate Strategy & Communications Director	Federal Government	Introduction of Rezolv and St George project, Q&A on production licensing process	None
RESGMTG012	Formal Meeting	21/08/2023	Deputy Minister of Energy Iva Petrova and her team	Chief Business Development Officer, Legal & Business Development Director	Federal Government	Introduction of Rezolv and St George project, future business intentions	None
RESGMTG013	Formal Meeting	21/08/2023	Deputy head of SEDA	Chief Business Development Officer, Legal & Business	Federal Government	Introduction of Rezolv and St George project, future business intentions	None

Meeting Details			Stakeholder Details			Meeting Summary	Follow up Actions
No.	Record type *pick from drop-down*	Date *dd/mm/yyyy*	Key Stakeholder Name *Free text*	Role *free text*	Key Stakeholder Group *pick from drop-down*	Meeting summary / Key issues raised	Action *free text*
				Development Director			
RESGMTG014	Formal Meeting	21/08/2023	Energy and Water Regulator Chairman and his team	Chief Business Development Officer	Federal Government	Progress towards construction	None
RESGMTG015	Formal Meeting	21/08/2023	Head of Parliament Energy Committee Delyan Dobrev	Chief Business Development Officer	Federal Government	Introduction of Rezolv and St George project, future business intentions	None
RESGMTG016	Formal Meeting	21/08/2023	Yavor Georgiev Seller	Chief Business Development Officer	Landowner (main site)	Concrete waste disposal issue	None
RESGMTG017	Informal meeting/conversation	21/08/2024	Rosen Nikolov	Senior Manager @ Alexander Lees	Local business, Enterprises	Introduction of Rezolv and St George project to local logistics business on edge of the site. Mr Nikolov is also a landowner by the Control Tower. (With IFC/RSK)	None

Meeting Details			Stakeholder Details			Meeting Summary	Follow up Actions
No.	Record type *pick from drop-down*	Date *dd/mm/yyyy*	Key Stakeholder Name *Free text*	Role *free text*	Key Stakeholder Group *pick from drop-down*	Meeting summary / Key issues raised	Action *free text*
RESGMTG018	Formal Meeting	21/08/2025	Angel Jelev	Mayor of Lambrinovo (end of term)	Local Goverment (Mayors, Administrative Autority)	Introduction of Rezolv. This was the first meeting with the Lambrinovo Mayor. Mayor and PL Community is largly supported of the project but raised issue of concrete waste (With IFC/RSK)	Agree strategy on waste removal
RESGMTG019	Informal meeting/conversation	21/08/2026	Café owner Smilets	The only local café in the area and local shop	Local business, Enterprises	Introduction of Rezolv and St George project. (With IFC/RSK)	None
RESGMTG020	KII	15/05/2024	Local Business owner	P. Lambrinovo	Community	Refer to meeting minutes	Update findings in ESIA
RESGMTG021	KII	15/05/2024	Health Professiaonals (x 2)	Kapitetrovo GP	Community	Refer to meeting minutes	Update findings in ESIA
RESGMTG022	KII	16/05/2024	Mayor	P. Lambrinovo	Community	Refer to meeting minutes	Update findings in ESIA
RESGMTG022	KII	16/05/2024	Seasonal Residents x 4	P. Lambrinovo	Community	Refer to meeting minutes	Update findings in ESIA
RESGMTG022	FGD	28/05/2024	Women	Aydemir	Community	Refer to meeting minutes	Update findings in ESIA
RESGMTG022	FGD	28/05/2024	Women	Kalipetrovo	Community	Refer to meeting minutes	Update findings in ESIA
RESGMTG022	FGD	28/05/2024	Women	P. Lambrinovo	Community	Refer to meeting minutes	Update findings in ESIA

Meeting Details			Stakeholder Details			Meeting Summary	Follow up Actions
No.	Record type *pick from drop-down*	Date *dd/mm/yyyy*	Key Stakeholder Name *Free text*	Role *free text*	Key Stakeholder Group *pick from drop-down*	Meeting summary / Key issues raised	Action *free text*
RESGMTG022	FGD	28/05/2024	Women	Smilets	Community	Refer to meeting minutes	Update findings in ESIA
RESGMTG022	FGD	28/05/2024	Older adults	Aydemir	Community	Refer to meeting minutes	Update findings in ESIA
RESGMTG022	FGD	28/05/2024	Older adults	Kalipetrovo	Community	Refer to meeting minutes	Update findings in ESIA
RESGMTG022	FGD	28/05/2024	Older adults	P. Lambrinovo	Community	Refer to meeting minutes	Update findings in ESIA
RESGMTG022	FGD	28/05/2024	Older adults	Smilets	Community	Refer to meeting minutes	Update findings in ESIA
RESGMTG022	FGD	28/05/2024	Youth	Aydemir	Community	Refer to meeting minutes	Update findings in ESIA
RESGMTG022	FGD	28/05/2024	Youth	Kalipetrovo	Community	Refer to meeting minutes	Update findings in ESIA
RESGMTG022	FGD	28/05/2024	Youth	P. Lambrinovo	Community	Refer to meeting minutes	Update findings in ESIA
RESGMTG022	FGD	28/05/2024	Youth	Smilets	Community	Refer to meeting minutes	Update findings in ESIA

Table 16: Open day meeting outcomes

Issue, grievance or suggestion	Project Response	ESIA reference	Ongoing actions
Will there be any job openings? If so, what type of jobs and how can we apply? What roles do Rezolv Energy and the EPC play regarding the job openings?	Considering the work is mainly in the electrical field, the EPC will bring its own specialized workforce. We don't know yet if, what type and how many jobs will be available. Rezolv management plans, include requirements for local hiring and a local hiring policy (where possible)	Section 2.17	Follow up on mechanism for local hiring as part of the ESMP.
Destruction of agricultural activity	Livelihood impact assessment will be performed to assess impacts on livelihood and identify any supplementary restoration measures as necessary (PV site and OHLT) that are not covered by national regulations. The ESIA highlights that for the OHTL impacts will be short term and not extend over one year (maximum). Farmers may return to work under the OHTL in all areas except the permanent footprint of the towers.	Section 6.4	Ongoing preparation of livelihood restoration plan.
Noise between solar park and the nearby residential areas (south of the park) in particular what is the noise level of the inverters.	Meeting response (MR) - 45 decibels. The aim is to install inverters as far away from the houses as possible. Community members commented that 45 decibels are the same noise level as the local produce refrigeration company, and this is too loud. It was explained how inverters will be installed under the panels and that there will be noise studies before, during and after construction. Community members expressed concerns about the absorption panels ESIA response - Propose to conduct further studies (baseline noise survey and modelling) to model construction and operational noise at the project receptors. For operational noise, the Project proposes to install noise protection around 7 closet inverters at the southernmost section of the site (as a minimum) – to be	Section 2.6.1 – description of the inverters and proposed noise barriers, Section 14 – preliminary noise risk assessment.	Ongoing operational noise modelling.

Issue, grievance or suggestion	Project Response	ESIA reference	Ongoing actions
	reviewed following finalization of the operational noise modelling and extended to other inverters if needed.		
Suggestion for construction of a noise-insulating wall-fence between the "St. Georgi" solar park and the village (third street).	No single noise barrier is considered at this time . refer to above point about noise barriers around the individual inverters (see Figure 8.for illustration of the inverters to be installed on the project.	Section 2.6.1 – description of the inverters.	Operational noise modelling is ongoing.
What measures are being taken to restore field protective forest belt (Community members raised concerns about destroyed habitats (there used to be hares, deer, foxes, pheasants, others)?	MR - Rezolv spoke about a commitment to restore natural fences around the park. ESIA – requirement added to the ESIA for restoration of habitats (biodiversity corridors) around the periphery of the site (subject to health and safety considerations)	Section 7.2.1 – Mitigation table.	Consultation with the relevant authorities responsible for such matters will be undertaken to find the optimal solution for restoring the hedge
Who is responsible for clearing of the construction waste, tree roots and others accumulated during the preparation of the land for the construction of the "St. Georgi" solar park?	MR – Rezolv committed to look into this matter to identify a solution ESIA – disposal of historical demolition waste included in ESIA. Specific commitment added to mitigation table to confirm composition of demolition waste disposed adjacent to the project site and prepare a disposal plan for safe removal to an approved location.	Section 10 -Solid waste management impact assessment.	Ongoing planning for waste disposal and feedback to community once the plan is confirmed.
What efforts are being made to comply with all requirements aimed at maximum preservation of the environment, small plantations, tree species, requirements related to the ornithology and plover nesting?	MR - Rezolv spoke about a commitment to restore natural fences around the park. ESIA – requirement added to the ESIA for restoration of habitats (biodiversity corridors) around the periphery of the site (subject to health and safety considerations)	Section 7 – mitigation table	Feedback during follow up community meeting April 2024
Is there a danger of fire due to the proximity of the solar panels to the village?	MR - The fire hazard is an important matter. For that reason, we will ensure a fire policy is in place and staff are trained and practice drills ESIA – new section added to address concerns regarding fire risk. Fire preparedness and response measures noted in the mitigation table and ESMP, including a requirement to prepare an emergency response plan that has measures in place for interacting	Section 16.3.6	Feedback during follow up community meeting April 2024

Issue, grievance or suggestion	Project Response	ESIA reference	Ongoing actions
	with the community in the event of a fire.		
Are there any requirements regarding the proximity of the first line of panels of the solar park to the first houses of the village?	ESIA – there are no specific setback requirements.	Section 2.5	Feedback during follow up community meeting April 2024
Community members living right on the edge of the project raised concerns that the land plots closest to the village were not part of the EIA?	The ESIA includes the land plots to the south of the village.	Section 2.5	Feedback during follow up community meeting April 2024
What is the impact of EMF? How far does EMF extend?? What are its health effects	MR - Just like any other electrical device, the electric fields created by a solar system are very weak and are easily shielded or weakened by walls and other objects. Solar panel systems are not linked to causing health problems in adults or children ESIA – new section added to ESIA to address EMF impacts related to the PV site and the OHTL During construction, Project company will issue further leaflets on working safety under OHLT and EMF risks to community to support return to work under the line to minimize secondary livelihood impacts.	Section 16.3.5	Feedback during follow up community meeting April 2024
What are the impacts of sunlight absorption and reflection during strong sunlight?	MR – A study on glare of the panels has been undertaken and the results will be shared when finalized. (PMN – this information was provided to the community in error. No glint and glare study has been performed; this topic is scoped out for now. ESIA –scoping section Scoping table in Annex A outlined rationale for scoping out glint and glare impacts. Should any unanticipated adverse impacts arise these will be managed through our grievance redress process including an investigation into the impact and determination of mitigation measures e.g. screening or other.	Annex A.	Feedback during follow up community meeting April 2024
Request to grow a hedge taller than the panels along the whole southern edge of	Refer to response above relating to restoration of natural habitats around the boundary of the site subject	Section 7 – mitigation table,	Feedback during follow up community meeting April

Issue, grievance or suggestion	Project Response	ESIA reference	Ongoing actions
the park in vicinity of the village. One grievance on the hedge clearance was apparently submitted in 2023.	to health and safety requirements and shading considerations.		2024
Compensation requested about damaged road and concrete disposal	MR – Rezolv committed to look into this matter to identify a solution ESIA – disposal of historical demolition waste included in ESIA. Specific commitment added to mitigation table to confirm composition of demolition waste disposed adjacent to the project site and prepare a disposal plan for safe removal to an approved location.	Section 10 -Solid waste management impact assessment.	Ongoing planning for waste disposal and feedback to community once the plan is confirmed.
Question on road access – the one near the village should be avoided	MR –Rezolv highlighted in the meeting that Access 3 (the access nearest to be village) will be used as back and avoided where possible.	Section 2.7	Reflect access obligations in EPC Contract.
Question on housing of workers	MR - Rezolv committed to communicating with the municipality on the matter. Workers will not be living in PL, but maybe living in Silistra ESIA – ESIA is updated to reflect this commitment.	Section 2.16	Reflect accommodation obligations in EPC Contract.
Will the panels be on the runway, or the runway will be destroyed/removed	MR - The runway apron will most likely be used as an access road. It will not be removed	Section 2.10	Feedback during follow up community meeting April 2024
Mayor of Silistra offered to receive grievances through the PL mayor and requested a copy of answers to all questions	ESIA - add this grievance submission option to the grievance redress mechanism in the SEP	SEP – GRM	Follow up by CLO to define specific pathways for passing grievances to the CLO for action
How are answers going to be shared to grievances so that everyone is aware on common issues	ESIA - Where a specific grievance is raised directly by a stakeholder, the stakeholder will get a direct response. The CLO will also report regularly and provide generation feedback responses via social media or community notifications and meetings. For questions raised during the open day and on the draft ESIA, the responses will be provided in the ESIA, and the CLO will also give feedback on specific responses to the community via a follow up community meeting .	Section 5.4.1	Feedback during follow up community meeting April 2024

Issue, grievance or suggestion	Project Response	ESIA reference	Ongoing actions
Will maintenance of the solar panels be with chemicals or physical	MR – physical ESIA - The Project will have a robotic dry-cleaning system (RCS) based on the final selected PV module. The RCS will be fully automated with no requirements for any labour during operation and will be operated by the auxiliary power generation unit. The RCS will not require any water consumption under operation, although there may be water use for the cleaning of the RCS equipment quarterly; otherwise, plant performance will be degraded. For wet cleaning, small amounts of water per PV module are required. The whole process is not expected to use additives that might alter the water quality. Nevertheless, in case of usage, it must be biodegradable with low environmental impact, contain no volatile organic compounds (VOCs) phosphate and be chlorine-free	Section 2.6.5 – explanation on dry robotic cleaning system.	Feedback during follow up community meeting April 2024
What is the deadline for concrete removal? Highlighted that removal should be done before the start of construction.	MR – one year. ESIA – refer to response above.	Section 10.	Feedback during follow up community meeting April 2024
Request for confirmation of environmental permit date	MR - 2009	n/a	None
Request for support for social activities in the following areas: **i.** Design and construction of an orthodox chapel "Ascension Of Christ" on the territory of the village. **ii.** Asphalting and maintenance of streets in the village. **iii.** Replacement of the lighting fixtures on the streets. **iv.** Construction of video surveillance	ESIA/ ESMP – A community development plan will be prepared based on further socio-economic surveys and consultation to develop a CDP that reflects the community objectives of Rezolv and community needs	ESMP	None at this time.

Issue, grievance or suggestion	Project Response	ESIA reference	Ongoing actions
of the territory of the village and the approaches to it. **v.** Construction of a children's playground and outdoor area with fitness equipment in the village park. **vi.** Supporting the public reading center "lambrinovo - 2013" **vii.** Possibility of using the investor's equipment, if necessary, for maintenance of roads, sidewalk and lawn areas. **viii.** Study of the possibilities of uninterrupted electricity - powering a water pump supplying the village with water			

5.4.4. Planned Stakeholder engagement

The SEP includes an ongoing engagement program intended to cover ongoing consultation and disclosure activities up to the start of construction and beyond. A summary of planned activities is also presented below.

Table 17: Planned stakeholder engagement

No	Type of engagement	Stakeholder Group	Planned date	Notes
1	Lender Disclosure	All stakeholder groups	April 2024 – June 2024	Information disclosure on final draft ESIA via Lender websites - ONGOING
2	Socio-economic census	Project affected persons (PV site and OHLT)	June 2024	
3	Open day follow up meeting	April 2024	Within 6 to 8 weeks of open day	Completed/
4	Information disclosure, social media, and media releases prior to commencement of construction	All stakeholders	Prior to commencement of construction (expected to be Q3 2023)	Planned
5	Public meetings prior to commencement of construction	All stakeholders with specific attention to community leaders and local community members	Prior to commencement of construction (expected to be Q3 2023)	Planned
6	Face to face meetings before work commences in the identified grazing areas	Directly affected land users	At least two weeks before work commences in their grazing area (expected to be Q3 2023)	Planned
9	Information disclosure, social media, and media releases	All stakeholders	At key milestones during construction	Planned
10	Public meetings	Community leaders and local community members	At key milestones during construction and at least monthly	Planned
	Information disclosure, media releases and social media prior to commencement of operations	All stakeholders	Prior to commencement of operations (expected Q2 2024)	Planned
11	Public meetings prior to commencement of operations	All stakeholders with specific attention to community leaders and local community members	Prior to commencement of operations (expected Q2 2024)	Planned

No	Type of engagement	Stakeholder Group	Planned date	Notes
12	Information disclosure, media release, social media, and annual reporting	All stakeholders	At key milestones during operations or at least annually	Planned
13	Public meetings	All stakeholders with specific attention to community leaders and local community members	At key milestones during operations or at least annually	Planned

5.4.1. Grievance mechanism

The effective external Grievance Mechanism (GM) enables any stakeholder to make a grievance about the way the Project is being designed or implemented. Grievances may take the form of specific complaints for damages/injury, concerns about routine Project activities, or perceived incidents or impacts. A grievance mechanism has been established for this project, tailored to respond to the local community needs as well as to other stakeholders' interests and issues. It aims to find mutually beneficial solutions to settle eventual issues, concerns or perceived incidents or impacts, developing a trust-based Company-community relationship. The GM for the Project is structured as follows:

Figure 18. *Grievance Mechanism for the Project*
Source. Stakeholder analysis

The GM will be widely disclosed during all interactions with the Project community and on Project documentation (e.g. leaflets) and the Project website. Grievances may be submitted verbally or in written format using the project grievance form or other form) directly to the CLO, via the Mayor of Silistra, project website and social channels. All grievances will be treated confidentially and can be raised anonymously if preferred. Further detail on the specifics of the Project GM can be found in the SEP, section 11. A grievance log has been established and is provided in Table 18 below.

Table 18: Project Grievance Log (summarised from main G. Log provided in the SEP)

No.	Submission date	Project component	Complainant	Brief description	Event type	Grievance & issues/Request, Suggestion	Recommended Action for closure (Free text)	Responsible person / Responsible party Free text	Target date for closure	Immediate Action taken (e.g. investigation) Free text
	dd/mm/yyyy	*Pick from drop-down menu*	*Confidential*	*What happened? Who was involved? Who did it happen to? When? Where ?*	*Drop-down menu*	*Drop-down menu*			*dd/mm/yyyy*	
RESG001	09/03/2024	Main Site	Community (various)	Removal aggregate and demolition waste to unapproved and in appropriate site adjacent to the project.	Environmental concern	Grievance	disposal of historical demolition waste included in ESIA. Specific commitment added to mitigation table to confirm composition of demolition waste disposed adjacent to the project site and prepare a disposal plan for safe removal to an approved location.	ESG Director	Mar-25	1. Follow up with local company to understand actions taken 2. Legal follow up to understand liabilities for clean up
RESG002	09/03/2024	Main Site	Community (various)	hedgerow removal along the boundaries of the site were undertaken without consultation	Environmental concern	Grievance	requirement added to the ESIA for restoration of habitats (biodiversity corridors) around the periphery of the site (subject to health and safety considerations)	ESG Director	Mar-25	consultation with relevant ecological bodies

5.4.1. Monitoring and reporting

All stakeholder engagement activities will be monitored, documented, and filled, thus ensuring accountable delivery of commitment to the stakeholders. The documentation will be maintained by the Company during all three phases of the Project – *pre-construction, construction, and operation* – and consists of:

- Stakeholder engagement log – *store, analyze and report dialogues with stakeholders.*
- Commitments register – *keep track of the commitments made to various stakeholders.*
- Meeting minute template – *collect meeting minutes, attendance sheets, photographic evidence and copies of adverts placed in newspapers and other media.*
- Stakeholders list – *ongoing updates to the list of stakeholders, including key contacts and contact details (telephone number, e-mail addresses).*
- Grievance log – *all the grievances received via any means of communication will be recorded, together with management actions taken and whether it has been closed out satisfactorily.*

The Project Company will develop an annual Environmental and Social Report on the project's environmental, social and health and safety performance and share it with interested stakeholders.

Feedback on the Grievance Log and SE Log will be reported regularly to the impacted communities about the progress of the Project and the status of the grievance closed out. The Company will keep track of commitments made (commitments tracker) (Appendix E) and communicate progress made against these commitments regularly.

6. BASELINE CHARACTERISATION

6.1. Overview of baseline data collection activities

Baseline information has been collated, based on site visits undertaken (primary data collection) and desk-based information available at the time of the assessment (secondary data). The methodology used in the baseline assessment, any consultations undertaken, the temporal and spatial extent and any limitations establishing the baseline are described in the baseline chapter. Primary survey activity performed specifically for the ESIA includes:

- Socio-economic survey (June 2024))
- Biodiversity survey work (commenced in March 2023 to February 2023)
- Noise baseline survey
- General walkover of direct AOI of main site and OHTL

The complete baseline characterisation of biodiversity from the project site, the noise baseline and the socio-economic survey findings are presented in Volume III. Key findings are summarised in the following baseline sections.

6.2. Protected areas

The PV Site and OHTL ROW are located outside the boundaries of any natural protected area, the closest natural protected area within the wider AOI (up to ~10km) being:

- According to Habitat Directive 92/43:
  - BG0000169 Ludogorie - Srebarna - the project borders the protected area ("L-S Protected Area")
  - BG0000241 Srebarna - the project is situated to a distance of approx. 4,7 km
  - BG0000534 Ostrov Chayka - the project is situated to a distance of approx. 6,5 km
  - BG0000168 Ludogorie - the project is situated to a distance of approx. 6,6 km
  - BG0000106 Harsovska reka - the project is situated to a distance of approx. 11 km

- according to Bird Directive 2009/147:
  - BG0002062 Ludogorie - the project is situated to a distance of approx. 7,8 km
  - BG0002039 Harsovska reka - the project is situated to a distance of approx. 11 km

- according to Law on Protected Areas (Protected areas of Bulgaria):
  - „Pelikanite" Protected area - the project is situated to a distance of approx. 6 km
  - "Srebarna" Nature reserve - the project is situated to a distance of approx. 5,9 km[24]
  - "Pametnika" Protected area - the project is situated to a distance of approx. 9,6 km
  - "Medjidi Tabia" Protected area - the project is situated to a distance of approx. 6,4 km
  - "Esetrite-Vetren" Protected area - the project is situated to a distance of approx. 10,3 km

Further information on the nearest protected areas is provided below.

[24] According to map available at https://worldheritageoutlook.iucn.org/explore-sites/wdpaid/9612

Natural protected areas according to Habitat Directive 92/43
BG0000169 Ludogorie – Srebarna (L-P Projected Area)
Type: Terrestrial and Inland Waters Protected Areas

Figure 19: Location of project related to BG0000169 Ludogorie – Srebarna

Figure 20: Location of project related to BG0000169 Ludogorie – Srebarna – detail

There is a narrow strip of agricultural land, approximately 30 metres that acts as a barrier between the outer boundary of the Natura 2000 site and the Project boundary as illustrated in Figure 21.

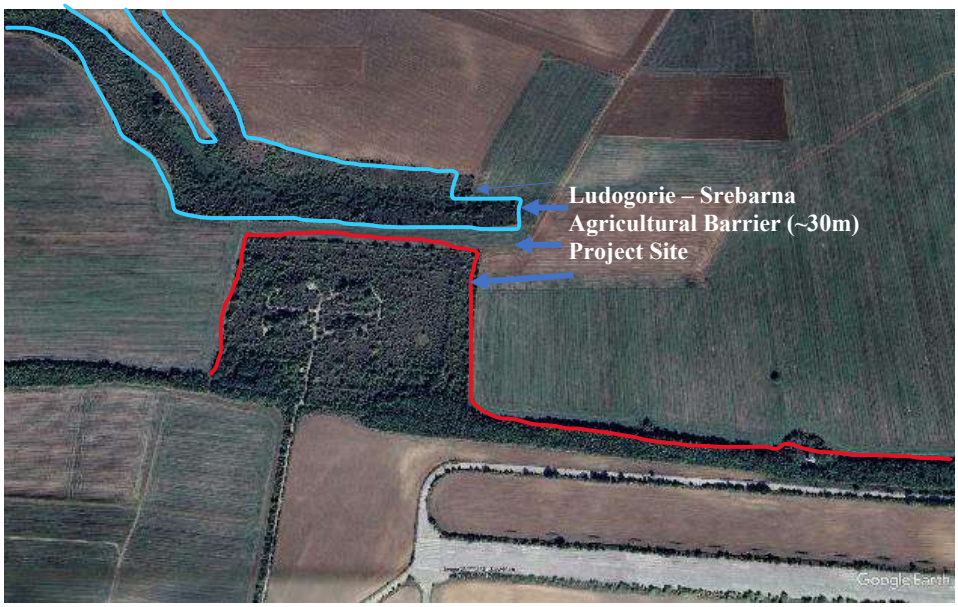


Figure 21: Close up of boundary between Natural 2000 site and Site boundary

BG0000241 Srebarna – 4,7 km (to outer edge of buffer zone)
The Srebarna Nature Reserve is a freshwater lake adjacent to the Danube and extending over 600 ha on the Romanian border, supplied by seasonal floods from the River Danube one kilometre to the north.

It is the breeding ground of almost 100 species of birds, of which 24 are rare or endangered. Some 80 other bird species migrate and seek refuge there every winter[25]. Among the most interesting bird species are the Dalmatian pelican, great egret, night heron, purple heron, glossy ibis and white spoonbill. It is inscribed based on the fact that it protects an important example of a type of wetland that was widespread in Bulgaria in the past. It shelters a diversity of plant and animal species, which are increasingly threatened. The rich bird life supported by Srebarna Nature Reserve is the basis for its international significance. The property is protected by a 673-ha buffer zone which was created in 2008. This consists of a portion of the Srebarna Nature Reserve that is not part of the World Heritage property and 419 ha of land surrounding the Srebarna Nature Reserve, which is located within an adjacent protected area known as Pelikanite. The aim of this buffer zone is to prevent and reduce negative human impacts on the reserve.

The boundaries of the protected area for birds (the same signature: BG0000241) and for habitats coincide, i.e. completely overlap. Within the boundaries of the protected area, there are also two categories of protected areas within the meaning of the Law on Protected Areas (in Bulgaria), namely: “Srebarna” Nature reserve and as a buffer - "Pelikanite" protected area (former buffer zone around the reserve, which was recategorized in 2011-2012).

Srebarna Lake is also protected as a Wetland of International Importance under the Ramsar Convention and as a UNESCO Biosphere Reserve.

[25] http://world-heritage-datasheets.unep-wcmc.org/datasheet/output/site/srebarna-nature-reserve/

Figure 22: Location of project related to BG0000241 Srebarna

BG0000534 Ostrov Chayka – 6,5 km

Figure 23: Location of project related to BG0000534 Ostrov Chayka

BG0000168 Ludogorie – 6,6 km

Figure 24: Location of project related to BG0000169 Ludogorie

BG0000106 Harsovska reka – 11 km

Figure 25: Location of project related to BG0000106 Harsovska reka

Bird Directive 2009/147

BG0002062 Ludogorie – 7,8 km

Figure 26: Location of project related to BG0002062 Ludogorie

BG0002039 Harsovska reka

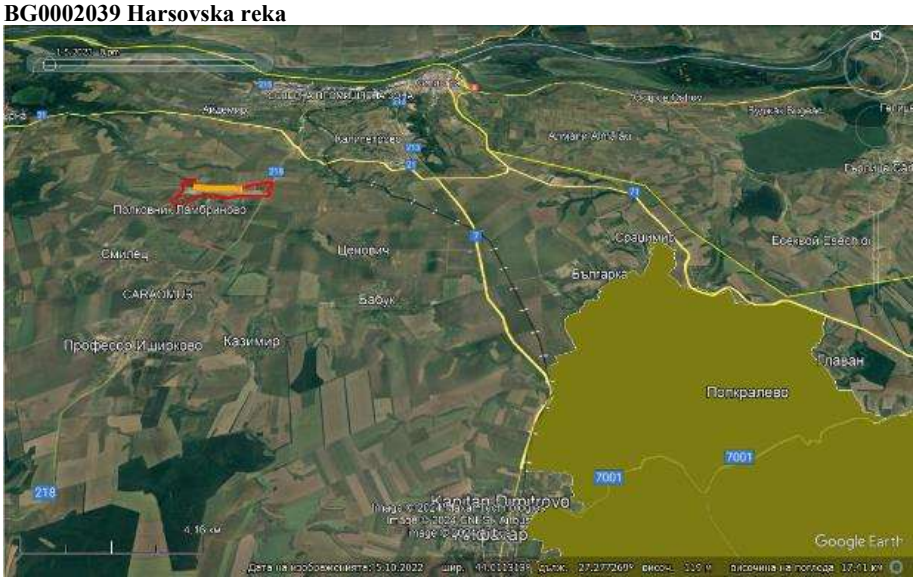


Figure 27: Location of project related to BG0002039 Harsovska reka

Protected areas Bulgaria - Law on Protected Areas

„Pelikanite“ Protected area – 6 km

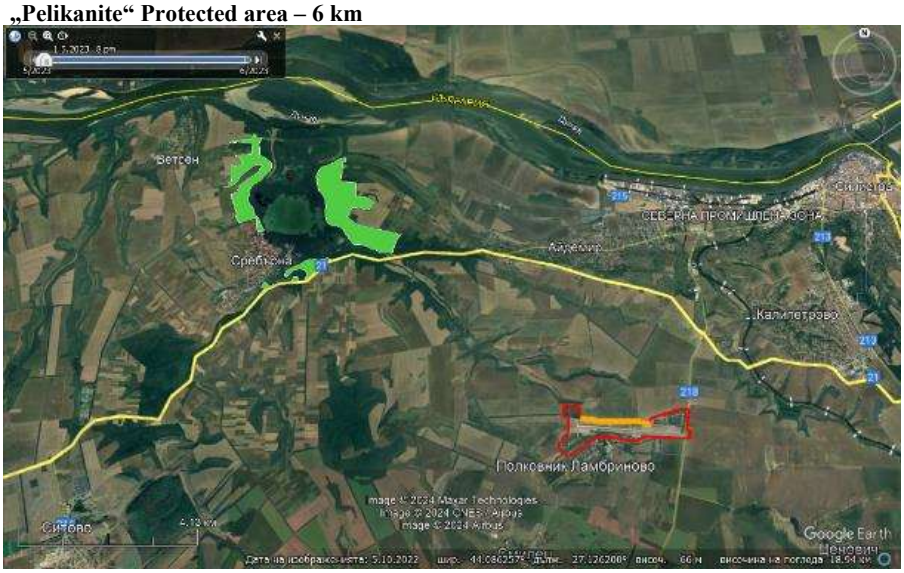


Figure 28: Location of project related to protected area „Pelikanite“

“Pametnika” Protected area – 9,6 km

Figure 29: Location of project related to protected area “Pametnika”

Protected area “Medjidi Tabia” – 6,4 km

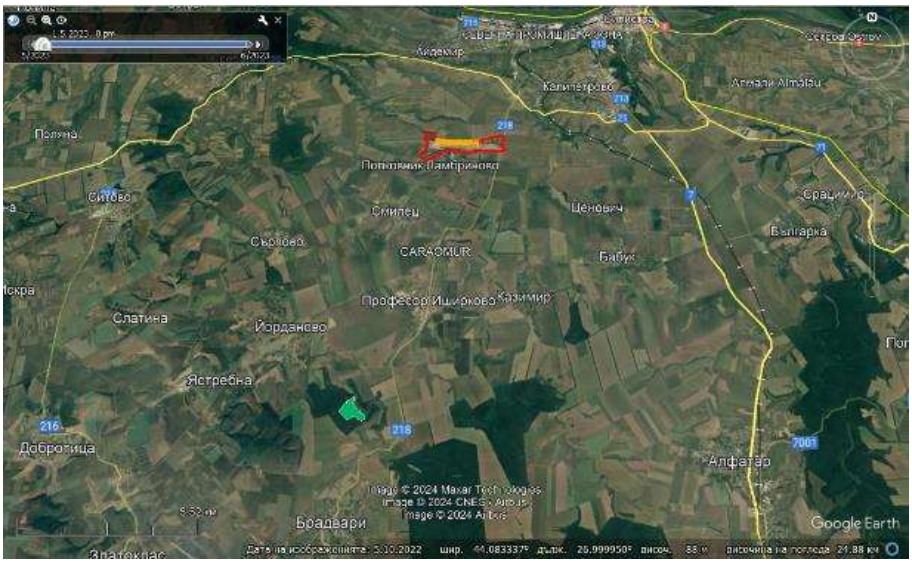


Figure 30: Location of project related to protected area "Medjidi Tabia"

"Esetrite-Vetren" Protected area – 10,3 km

Figure 31: Location of project related to protected area "Esetrite-Vetren"

The closest protected area (BG0000169 "Ludogorie - Srebarna") "L-S Protected Area" is classified a Natura 2000 site and includes the boundaries of the protected area for birds (the same signature: BG0000241).

6.3. Flora, Fauna and Habitats

6.3.1. Methodology (main site)

Baseline data was developed using a combination of desk-based review of secondary information sources and primary data gathering through a field survey effort conducted within the PV Site during Spring 2023 and Summer 2023 and included the following:

- Plants (vascular)
- Invertebrates (Diurnal butterflies and nocturnal butterflies, beetles, insects)
- Amphibians and reptiles (tailed amphibians (Caudata), tailless amphibians (Anura), turtles (Testudines), lizards (Sauria), snakes (Serpentes)
- Mammals (Golden Jackal, wildcats, hamster, ferrets)
- Habitat mapping

Methodology for monitoring FLORA

VASCULAR PLANTS

Field work

The field surveys were conducted during the period April-September 2023. The descriptions of the vegetation followed the methodical approach of Braun-Blanquet (Braun-Blanquet 1965, Westhoff & van der Maarel 1973) and were made in homogeneous and representative sections of the plant communities. The size of the trial plots is standardized and follows widely accepted standards in phytocenology (Chytry & Otypkova 2003. van der Maarel 2005). According to Dengler et al. (2009) the size of each plot should be the "minimum area for plant community emergence", i.e. the smallest territory in which all the species distributed in it occur or at least 90% of them.After laying the site, it is marked in the four corners. Additionally, species that occur near the test sites, but do not fall into them, are also noted.

The determination of the higher plants (without the mosses) follows Delipavlov & Cheshmedzhiev (2003), but separate references were also made to the volumes of Flora of Bulgaria I-XI (Yordanov 1963-1979, Velchev 1982, 1989, Kozhuharov 1995, Kozhuharov & Anchev 2012).

Habitats from Directive 92/43 of the EEC (1992) are defined in accordance with the Interpretation Manual of European Habitats (2007) and Kavrkova et al. (2009). Natural habitats have also been assessed according to the Red Book of the Republic of Bulgaria (Biserkov et al. 2015).

The vegetation in the area (within a radius of about 5-10 km around the future site for the FPP) is represented by residual xerothermic low-stemmed oak forests, as well as by secondary communities of the hornbeam. Usually, these are mixed forests of cer (*Quercus cerris*), white oak (*Quercus frainetto*) and hornbeam (*Carpinus orientalis*), and depending on the specific conditions, one or the other oak prevails. The hornbeam, with more abundant development, can form a second

floor (undergrowth), which is of a very fragmentary character. In the shrub communities there is also the dogwood (*Paliurus spina-christi*) with the participation of hawthorn (*Crataegus monogina*), rosehip (*Rosa canina*), field blackberry (Rubus caesius).

Grass vegetation on the dry slopes it is composed of communities of sedina (*Chrysopogon gryllus*), bulbous meadow (*Poa bulbosa*) and bellisma (*Dichanthium ischaemum*), with an increased presence of annual grasses. The mesophytic communities of the meadow fescue (*Festuca pratensis*), the rosary meadow (*Poa sylvicola*), vole species (*Agrostis stolonifera, A. capillaris*) and others are characteristic in the moist meadows.

The site of the investment proposal falls within the territory of the former airport near the village of P. Lambrinovo.

The grass cover on the properties consists of a small number of calciphilous and ruderal species. Loose communities of annual and perennial herbaceous species are observed on the nutrient poor. Clusters with low coverage of: *Galium aparinae are observed; Cynodon dactylon; Arabis turrita; Lotus corniculatus; Echium vulgare; Chrysopogon gryllus; Filipendula vulgaris; Senecio vernalis; Teucrium chamaedrys; Sanguisorba minor; Eryngium campestre; Festuca valesiaca; Taraxacum officinale; Galium verum; Poa angustifolia; Achillea millefolium; Artemisia austriaca; Xeranthemum annuum* etc.

Areas occupied by grassy areas, represented mainly by ruderal types of plants - these are areas that were used for specialized equipment for servicing the airport and the storage of a squadron of Russian-made MIG aircraft, the so-called in Bulgarian - "buksi".

Within the boundaries of the areas planned for the construction of the Photovoltaic Project (PP), successional processes are observed, which have led to changes in the agrarian landscape, and these areas are grassed or covered with trees (forested mainly acacia - 90% and self-settled species, such as: walnut, elm, plum, gorse, hawthorn and others) and shrubs (blackberry, rose hip).

In June 2023, the company performing cleaning and preparation of the territory for the installation works of the installations, routes and photo panels carried out a complete removal of the grass vegetation from the prepared areas, and this caused a complete change of the microhabitats that exist despite human intervened in the territory.

The territory of the future FEC is located in an area dominated by intensively cultivated monocultures, in places intersected by forest protection belts. During field research, 5 EUNIS-classified habitat types were identified (Davies et al. 2004 - https://www.eea.europa.eu/data-and-maps/data/eunis-habitat-classification/documentation/eunis-2004-report.pdf/download), Habitats established in the study area and their EUNIS classification.

№	Habitat type	EUNIS
1	Unmanaged xeric grassland	E1.D
2	Robinia plantations	G1.C3
3	Lines of trees	G5.1

4	Airport runways and aprons	J4.4
5	Large-scale intensive unmixed crops (>25ha)	I1.11

Methodology for monitoring FAUNA

Methodology for monitoring INVERTEBRATES

Methodology for monitoring of Diurnal butterflies – Lepidoptera (D)
Field work

Of essential importance in the selection of the sample units and the time for conducting the monitoring are the knowledge of the following main characteristics of the individual species - (1) the known distribution of the species on the territory of the country, (2) the species-specific preferences for a certain type of habitat and (3) phenology - the flight period of the imago, and data on the biology of the species, including the food plant of the larvae, are also useful (see II. Description of the sites). Model maps of the monitoring areas are used in the field, showing the potential habitats for the respective species. The species of the group are diurnal and heliophilous. The establishment of individuals in the field is directly related to favorable weather conditions - cloudless, without strong wind. Recommended working hours are between 10am and 6pm. The research uses a simplified version of pollard's transect count (Pollard, E. 1977. A method for assessing changes in the abundance of butterflies. - Biological Conservation, 12: 115-134). In a modified version, butterflies are counted as they move along this transect, with the researcher counting individuals in front of him at a distance of width, length and height of 5 m. The number of transects in one monitoring territory is a minimum of 1. Butterflies are observed or caught with an entomological net. Catching is done by swinging or trapping the butterfly, and it must fall through the hoop into the net. After the butterfly is caught, it is sealed in a small jar until it calms down and carefully examined to identify it. In case of doubt about the exact identification. During the transect, observations are also made for traces of negative human activities and their impact on the respective habitats. All characteristic moments during the study, such as the general view of the habitats, the identification of the studied species and detected damages from human activity, are captured with a digital camera.

Monitoring methodology nocturnal butterflies – Lepidoptera (N)
Field work

Of essential importance in the selection of the sample units and the time for conducting the monitoring are the knowledge of the following main characteristic features of the individual species - (1) the known distribution of the species on the territory of the country, (2) the species-specific preferences for a certain type of habitat and (3) phenology - the flight period of the imago, and data on the biology of the species, including the food plant of the larvae, are also useful (see II. Description of the sites). Model maps of the monitoring areas are used in the field, showing the potential habitats for the respective species. The species of the group are nocturnal. The establishment of individuals in the field is directly related to favorable weather conditions - moonless nights, without strong wind and heavy rainfall.

A determiner is used by a layman. In case of doubt about the exact identification, the butterfly is photographed, aiming to photograph the upper and lower sides of the wings. During the research, observations are also made for traces of negative human activities and their impact on the respective habitats.

Monitoring methodology - family Carabidae

Field work

Adult specimens are caught in a predetermined monitoring area for each of the species. Within the boundaries of this territory, the team defines the sample area within which the collection of data for the species is carried out by catching specimens of the respective species. Stationary work

In order to accurately determine the species, any photographs taken in case of doubts about the exact identification during the fieldwork are also processed. A preliminary analysis of the received data on the presence/absence of the indicator species is performed.

Monitoring methodology - order Coleoptera (large representatives)

Field work

Each transect is carried out by two people. All flying and ground-moving specimens are counted. Data were read every 100 m; The scheme is repeated until the end of the transect or until one hour has passed since its beginning.

Methodology for monitoring - order Mantodea

Field work

Available monitoring data for Orthoptera and Mantodea refer to area-specific communities and/or transect species complexes (see e.g. Riede 1998; Penone et al. 2013) or do not concern specific species, therefore do not provide information on the monitoring of the species under consideration. The research uses a transect method. The transect takes place during the day.

The recording of individuals of E. fasciata is mainly done by mowing in the herbaceous vegetation with an entomological bag, as the latter usually adhere to the herbaceous plants. Additionally, the vegetation is monitored for registration of individuals. For each transect, a total number of registered individuals is reported. During the transect, observations are made for traces of negative human activities and their impact on the respective habitats, for the condition of the habitat, as well as for the conditions of conducting the transect, which may lead, for example, to low activity of the individuals.

Monitoring methodology - species of the order Odonata

Field work

Model maps are used in the field, on which the potential habitats for the respective species are drawn. The research uses the transect method, i.e. the sample unit is a sample transect. Requirements for selecting the transects:

• Select easily accessible and well-lit (sunny in spring and summer) sections along the coast where the habitat type is relatively uniform

• The selected transects must be walkable on the same route each year

• If possible, the transect to closely follow the boundaries of the water basin

• Monitoring should be carried out when the dragonflies are active, according to the following rules: - in sunny weather - cloud cover below 60%; - at an air temperature (in the shade) above 15 C; - in comparative. calm weather (light to moderate wind) – up to 4 on the Beaufort scale (up to 29 km/h or 7.9 m/s). monitoring is NOT carried out if: - the air temperature is below 15°C or above 32°C in the shade; - the weather is cloudy - cloud cover over 60%; - strong wind – over 4 on the Beaufort scale (over 29 km/h or 7.9 m/s; when the wind shakes small trees); - in rainy weather.

The number of transects varies from 1 to 3 depending on the size of the studied territory. At each reading, at least 1-3 specimens of the indicator species are captured to verify its identity. This is done using a standard entomological bag. Observations of habitat changes are also carried out - traces of negative processes (anthropogenic influence, pollution, water level change, advanced succession) and their impact.

The collected data is filled in a corresponding field form. All characteristic moments during the study, such as the general view of the habitats, the identification of the studied species and detected damages from human activity, are captured with a digital camera.

Methodology for monitoring AMPHIBIANS and REPTILES

The present methodology is valid for all species of amphibians and reptiles, objects of monitoring of species from the five main groups of amphibians and reptiles: tailed amphibians (Caudata), tailless amphibians (Anura), turtles (Testudines), lizards (Sauria), snakes (Serpentes).

Field work

Stages of the field work in the trial area: Crawling/finding/measurement In the trial area, the walk follows the habitats suitable for the species(s) at the discretion of the experts. All amphibians and reptiles seen are recorded, if they are caught, their gender and age category are also determined, and the necessary measurements are taken.

For each specimen seen/caught/recognized by remains (individual recognizable elements or parts of species found), geographic coordinates are taken. All remains and traces of life activity found (turtle holes, characteristic tracks/tracks of land turtles) that can be reliably linked to a species are also reported. Fieldwork requires active search for species, which includes turning over rocks; stumps and other suitable shelters; track tracking (of land turtles); active search off roads and trails. Binoculars are required for some species – M. rivulata. Determinant of amphibians and reptiles in Bulgaria. Sofia, Zeleni Balkani, 196 c. Capture All species, except newts (I. alpestris, T. dobrogicus) will be captured directly if possible. When choosing the right technique for catching amphibians and reptiles, the leading principle is the "minimum direct impact" on them; After capture, amphibians and reptiles are measured as quickly as possible and released after they have been uniquely identified; In all cases of doubt as to the species affiliation of the respective amphibian and reptile specimens, a general plan, as well as their characteristic species-specific marks, shall be photographed; All amphibians and reptiles for which there is doubt as to species affiliation or have atypical features (eg partial albinism, injuries, strange formations, atypical growths, etc.) are also photo-documented; all caught specimens must be released at the place of their capture! Transportation to another place and their release in an unknown area is not allowed; Method for catching newts - Water bodies with a depth of more than 30 cm - placing live traps.

Methodology for monitoring MAMMALS

Golden Jackal monitoring methodology *(Canis aureus* Linnaeus, 1758)

Field work

Two monitoring areas have been selected. The distance between photo traps should be approximately 2 km (±300 m). Photo traps are placed near animal paths that are more likely to be crossed by members of the target species. Placed photo-traps remain at one point for 5-30 days. When placing each photo trap, a form (paper or electronic) is filled out, coordinates are taken with a GPS device and a photo is taken of the location for reference. The characteristics of the habitat are described.

To increase the probability of registration of the target species, an odour lure is placed in front of each photo-trap. The lure consists of valerian tincture (Valeriana officinalis L. & Maillefer) mixed with fat (oil) in a ratio of 3:1, in order to reduce the volatility of the alcohol extract and prolong the effect. The mixture is applied to a piece of absorbent material (sponge, piece of absorbent cloth, etc.) and fixed in a convenient place (stem/branch) about 1.5 - 2 m in front of the photo-trap, at a height of about 60-80 cm. odours attract predators such as jackals. According to some authors (Mech, personal communication), such Odors attract them mainly because of developed exploratory behaviours.

When approaching the place intended for placing a photo-trap, an attempt is made to place the same place, and if impossible, a suitable place is chosen (near an animal path, near a water source, if available). When determining the location, the photo-trap is placed on a tree, at a height of about 50 cm (±20 cm), stable to prevent it from moving due to strong wind, being pushed by an animal, etc. The space in front of the photo-trap is cleared of tall grasses and other vegetation which, when moved by the wind, could activate it. The bait is installed about 1-1.5 m in front of the photo-trap, on a suitable tree, branch or other.

Fill in all the necessary information in the form, regarding the placed photo trap and the habitat around it. The coordinates of the place are recorded, a photo is taken for reference, the photo-trap is activated, and the place is left.

With the technique of placing photo-traps in this way, within the provided distances, it is possible to install about 10 photo-traps per day, by one team.

The European wildcat monitoring methodology (Felis silvestris Schreber, 1777)

Field work

Monitoring of the wild cat is carried out using photo traps. In the locations of the photo traps in the selected monitoring areas, whether the target species is registered or not, as well as the general condition of the habitats, is taken into account.

Monitoring areas are determined based on literature data and potential habitats and so that they are representative of the distribution of the species.

Within one monitoring territory, 2 test areas and 2 points are defined. Each sample area is divided into four equal parts, 1/1 km squares. One photo trap should be placed in each square - a basic sampling unit in the wild cat monitoring methodology. It is recommended that phototraps be placed 1-1.5 km apart (Kilshaw & Macdonald, 2011). A shift from the initially set point for placing a photo trap is allowed within ±200m in the event of impossibility or sub-optimal conditions for its installation. Optimal conditions are defined as: presence of a tree for anchoring, absence of anthropogenic presence, presence of animal tracks near the site and/or traces of animal activity. After the initial determination of phototrap locations, they remain permanent unless permanent habitat changes occur (deforestation, fire, anthropogenic presence, etc.).

Photo traps are activated in the field for 5-30 days. It is important that the period is short in order to maximally meet the requirement of "closure" of the monitored population (Rowcliffe et al., 2008). Due to the extremely secretive way of life and the need to distinguish hybrids from "pure" wild cats, bait is used in order to increase the probability of registration and the possibility of obtaining more and better footage of an individual for its correct identification (Ancrenaz et al., 2012). Using a decoy allows the phototraps to not only look for animal trails to place when installing them, but to be able to place them at the pre-defined grid point if it meets the conditions regardless of whether there is a trail or not.

The bait consists of valerian tincture (Valeriana officinalis L. & Maillefer) mixed with fat (oil) in a ratio of 3 to 1, in order to reduce the volatility of the alcohol extract and prolong the effect. The bait is applied to a piece of hair-retaining material (e.g. velcro), nailed against the photo trap at a distance of about 1.5 - 2.5 m. The placement height depends on the specific conditions and is determined by the experts on site, but it should not be higher than the phototrap placement line.

At the expert's discretion, in places without anthropogenic presence, photo traps with a white flash are used to improve the possibility of identifying the target species, and in places with an increased or likely anthropogenic presence - those with an infrared flash.

The camera traps are pre-set to take 3 consecutive pictures in order to increase the probability of capturing and determining the recorded species. The video function is not used because white flash photo traps cannot capture nighttime, and the resolution of the video is lower, and it is difficult to determine the details of the spots.

Methodology for monitoring the Dobrudzhan hamster (Mesocricetus newtoni) and Common hamster (Cricetus cricetus)

Field work

Hole registration is a widely used method (France, Poland, etc.), but it has a high probability of error because the holes are similar to those of the laluger and the common hamster. These two methods are complementary, because the transect method is used to walk and survey suitable habitats during the day and select potential ones to set traps at dusk.

The main research method is the transect method.

Methodology for monitoring ferrets - Musteloidea

Field work

Registration with photo traps - 2 photo traps are placed. They are located as uniformly as possible in suitable habitats according to expert assessment. As the distance from each other is more than 1 km.

Mammals (except bats) - resume

The methods described in the previous parts of the report were applied, and in addition to the transect methods, the use of phototraps was also applied at two points in the northern part of the landfill planned for the PP, where there is a strip of trees mainly of acacia at the border of the ecotone.

The methods described in the previous parts of the report were applied, and in addition to the transect methods, the use of phototraps was also applied at two points in the northern part of the landfill planned for the PP, where there is a strip of trees mainly of acacia at the border of the ecotone:

Figure 32: L TRAP CAMERA LAMBRINOVO 1 – GPS: N 44.057371°, E 27.166504°

With this method and with TRAP CAMERA LAMBRINOVO 1, 3 types of mammals were identified: *Capreolus capreolus, Vulpes vulpes and Apodemus sylvaticus*

1. TRAP CAMERA LAMBRINOVO 2 – GPS: N 44.056155°, E 27.186628°

No individuals of the mammal group were found at this camera.

6.1.1.2.1. Methodology for monitoring BIRDS (AVI-FAUNA)

6.1.1.2.1.1. Migratory birds survey

The aim of the Bird Migration Survey is to establish:

1. Species composition
2. Flight height
3. To what extent the birds use the affected area, i.e. what is their behaviour and in which areas of the IP and what they use the territory for: searching for food, resting, sleeping or others.
4. Impacts and threats to species
5. Measures to mitigate impacts and threats to species

When carrying out studies on migration, the emphasis is on presenting in a unified way the qualitative and quantitative composition of migrants and the main parameters of their flight (BDZP, 2008; Michev, Profirov, 2010).

The visual survey of the migration of flying birds is carried out by direct observations from predetermined permanent stationary points (observation points - NP), daily throughout the migration period, during the daylight hours (7:00 - 18:00 astronomical time). In the period March 15 - May 15, the survey is carried out until 17:00 astronomical time, and in the period October 1 - 31, the survey is carried out until 16:00 astronomical time, due to the reduced length of the day.

During the survey, the airspace within a radius of up to 4000 m around the NP (up to 7000 m for large flocks of storks or pelicans) is monitored and all migratory birds passing through this space are described. Airspace control and how to describe all birds is detailed in the Biodiversity Baseline Report.

Selection of observation points

The selection of observation points (OPs) for migration is guided by the following criteria:

1. Excellent visibility in the defined perimeter (minimum 4000 meters, up to 7000 m in layer up to about 500 m height above the horizon line) around the observation point; this means that:

a. The OP must be located in an open place;

b. to be raised in relation to the surrounding territories;

c. is not adjacent (less than 1000 m) to forests, buffer forest belts or rocks, tall buildings that would obstruct visibility, especially to the direction from which migrants are expected to emerge.

Tall buildings in settlements, with adequate visibility on all sides (located in high parts of the village, with terraces) can also be used in the absence of other alternatives in the area.

2. Appropriate geographical location. The location of OPs on hills, plateau edges or river valleys is suitable for monitoring migration because it is combined with good visibility and geographical structures that birds are likely to follow or cover flying low. In this sense, observation points can also be located at the foot of mountains or in their transitional parts, but in this case, it is recommended that the high parts of the mountains are in the direction opposite to the direction from which the birds come.

3. Appropriate logistics arrangement. As the migration is monitored daily over a period of 2 to 3 months, including in adverse meteorological conditions (MTO), it is important when selecting an observation point that it is relatively easily accessible and connected to the base where

the observers stay. People need to be able to get food and water and have hygienic living conditions combined with economical transport costs. In this sense, the observation point must be accessible by car even in unfavorable conditions (rain), not more than 1 - 1.5 km away from the base where the observers are, especially if they do not travel by car every day or if the base not a caravan situated on the point itself.

4. Comprehensive / representative coverage of the study area. When the survey is carried out in a large territory that cannot be covered by 1 OP (distance between its borders 8,000 m), then a larger number of points corresponding to the objectives of the field survey is selected. When choosing more than one observation point, attention is paid to the following aspects:

a. Observation points must cover the entire surveyed territory without overlapping the perimeters of visibility; the minimum distance between two observation points, when there is no visual barrier between them, is 8,000 m;

b. When the study area is too large (for example for national studies) and financial / human resources are insufficient, the selection of observation points should be such as to allow maximum complete coverage of the area. When the territory is unexplored or unevenly explored, observation points are placed evenly, taking into account the objectives of the field survey (linear or in groups). When the nature of the migration is well known (for monitoring purposes), NPs are deployed at sites of intensive overflight, and for each such point an adjacent control area must be selected where no intensive overflight is considered to occur. For national level surveys, coverage of at least 20% of the presumed migration front is allowed. This percentage grows as the area of the studied territory decreases.

5. Location near protected areas for birds. Wherever possible, observation points should be selected in or near protected bird areas, as long as the relatively even distribution of observation points is not disturbed.

Other behaviour of migratory birds - hunting, landing/taking off during the day or at night

Any other behaviour of migratory birds - hunting, landing during the day or for the night, which is not described above, is described separately in textual form. When observing raptor hunting during migration, the duration and characteristics of this behaviour are described. If this is related to landing, note how many times and where the bird lands and for how long within the observation. When flocks of bird's land during the day or overnight for the night, the time of landing/departure is noted, as well as the location of the birds landed.

For the registrations of migratory bird species, a Protocol is filled out, which contains the following minimum information:

MIGRATION - form M1 - standard visual survey of flying birds, waterfowl and bee-eaters

Point/name: PEC Lambrinowo airport | Date: 29.09.2023 | Begin (h/min): 8:00 | End (h/min) 18:00

наблюдатели:

h/min	MTO t°C	Wind (force)	Wind (direction)	Wind (m/s)	clouds kind	cloudiness%	precipitation	visibility, m	Other (descriptive notes on MTO; change in the composition of observers; reasons for closing the point)
7:00									
8:00	-2	2	W-NW		cumulus	95	92	3000	a little bit of snow
9:00	1	2	SW-W		cumulus	95	89	4000	a little bit of snow
10:00	4	2	W		cumulus	100	84	1000	a little bit of snow
11:00	7	2	W-NW		cumulus	100	78	4000	
12:00	8	1	NW		cumulus	100	69	3000	a little bit of snow
13:00	9	2	NW		cumulus	80	56	8000	
14:00	9	2	NW		cumulus	70	47	8000	
15:00	2	3	NW		cumulus	100	87	1000	hevy snow
16:00	7	0	NW		cumulus	50	91	4000	
17:00	7	1	NW		cumulus	60	72	4000	
18:00	7	1	NW		cumulus	70	66	4000	

h/min	Species	Number	age/gender/phase	H (m)	distance to (.), m	Main direction	Kind of fly	The direction it's coming from	The direction it's going	Notes
8:18	F. coelebs	4	ad	15	100 N (.)	S-N	active	S	N	
8:24	B. buteo	2	ad	70	(.)	S-N	prey	S	N	
8:26	S. vulgaris	12	ad	10	50 W (.)	S-N	active	SE	NW	
8:43	M. calandra	23	ad	20	300 W (.)	SE-NW	active	SE	NW	
8:46	C. cyaneus	1	ad	20	300 W (.)	S-N	active	S	N	
8:47	F. cherrug	1	imm	50	(.)	S-N	active	S	N	
8:51	T. pilaris	17	ad	20	300 W (.)	S-N	active	S	N	
8:53	M. flava	9	ad	20	(.)	S-N	active	S	N	
8:55	F. coelebs	27	ad	15	300 W (.)	SE-NW	active	SE	NW	
8:56	C. carduelis	6	ad	20	50 N (.)	SE-NW	active	SE	NW	
9:00	Phylloscopus collybita	2	ad	10	(.)	S-N	active	S	N	
9:26	C. corone	15	ad	100	600 E (.)	S-N	active	S	N	
10:20	C. palumbus	21	ad	50	400 S (.)	SE-NW	active	SE	NW	
10:27	C. cyaneus	1	ad	30	100 W (.)	S-N	prey	S	N	
10:28	M. calandra	9	ad	30	300 E (.)	S-N	active	S	N	
10:30	M. calandra	12	ad	30	100 W (.)	S-N	active	S	N	
10:34	B. buteo	1	ad	30	600 E (.)	S-N	prey	S	N	
10:38	C. carduelis	34	ad	50	(.)	S-N	active	S	N	
11:21	G. cristata	22	ad	30	100 W (.)	S-N	active	S	N	

For example, one observation point was determined - M1 - 44.055134°, 27.182238°, which is located in the almost ideal centroid of the airport and is equally distant from the eastern (1320 m) and western (1640 m) ends of the future FPP. It is located at one of the highest points relative to the terrain - 122 m above sea level.

This section is based on the results and findings of the in-flight monitoring that was carried out in the spring season –2023

6.1.1.2.1.2. Nesting birds survey

The aim of the breeding bird survey is to establish:

1. Species composition
2. Attachment of species to certain habitats
3. Relative Number of Couples and Individuals
4. To what extent do birds use the affected area, i.e. what is their behaviour and in which areas of the territory of the future PP and what they use the territory for: searching for food, resting, sleeping or others.

5. Measures to mitigate impacts and threats to species

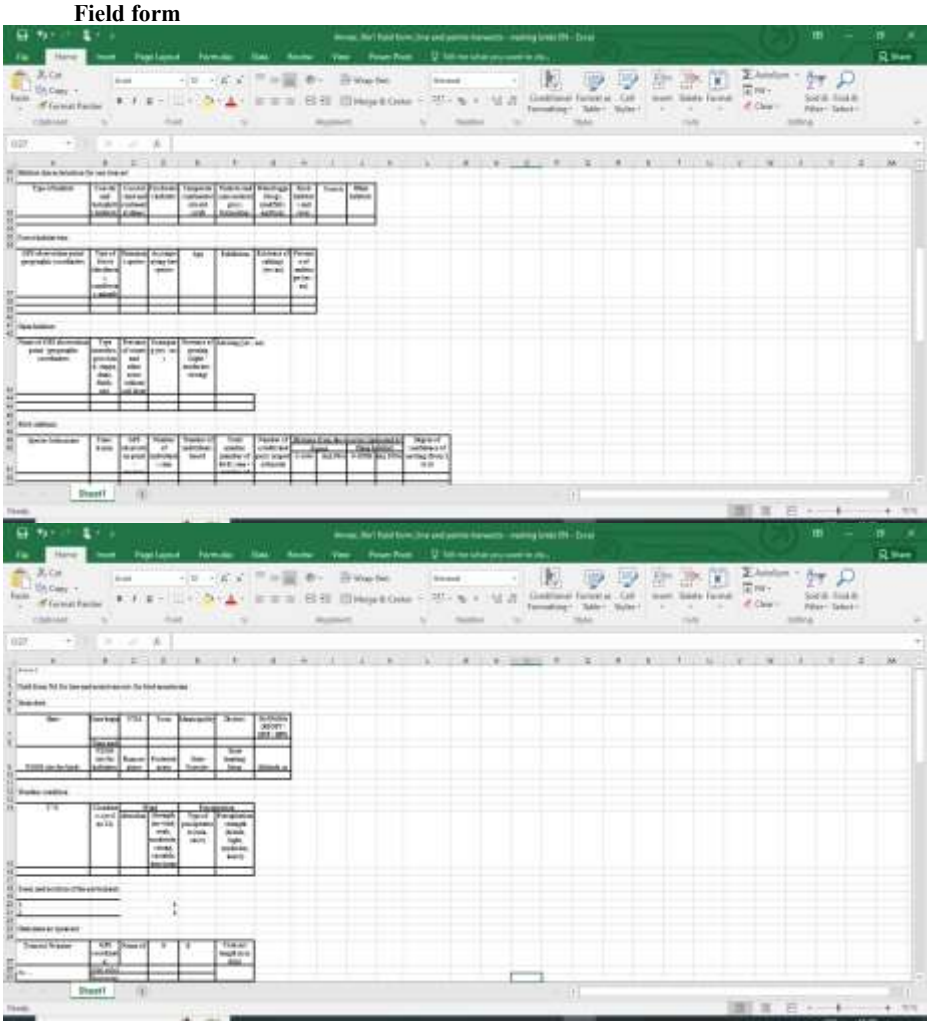
Approaches for determining transects, points, observation sites, etc. Equipment.

Practically the entire territory of the PP is suitable for carrying out linear transects for mapping passerine birds (Passeriformes). Their length can vary depending on the target species between 500m and 3000m, rarely more. The length of the transect is determined with a GPS device. The start and end point of each transect must be marked. Within the available habitats of a given species in the quadrat, the selection of the starting point of the transects is random, observing the rule that in forest and scrub habitats the smallest distance between the routes (tracks) of two adjacent transects cannot be more less than 300 m except when the transects are in opposite directions from a common starting point or when they are in completely different habitats and the start of the second transect (in a different habitat) is close to the end of the previous transect. In these cases, the distance between the routes (tracks) can be less than 200m. In forest habitats, the age of the forest, as represented for some of the species, should be taken into account for the selection of transects. In target habitats, "forest" should be followed, even though the road (trail) may enter open habitats and vice versa. If there is still a temporary and small change in the main habitat type along the transect route, this is marked with a GPS point. It is marked on Field Form #1 for transects in the columns for "forest habitat" and "open habitat", where the first column is for GPS points. If the place is not reached, it is marked in the "Notes" column at the end of the form. The best option for randomly selecting the starting points of the transects.

Monitoring parameters

In each square, all established bird individuals are recorded, regardless of which species and group they are - target species or not. For each observation, the species of the bird, the number of individuals found (number seen and number heard), the distance relative to the transect line or the observer in intervals 0-50m and over 50m for forest and bush habitats are recorded; 0-100m and over 100m for open habitats. In the column "number of individuals heard" only those birds that were heard but not seen are recorded. Those singing birds that are heard and seen must be noted in the column "number of individuals seen". Geographic coordinates are recorded on the field forms for each observed species within the transect or observation point. The habitat is described in detail at each transect or stationary point. After determining the type of habitat (forest, open, water, rocky), all the individual parameters of the forest and open habitats, which are noted in the forms, are determined. For forest habitats, these are - type of forest, dominant species, accompanying tree species, age of the forest, composition, presence of logging, presence of undergrowth. For open habitats, these are: type, presence of stones in %, swamping, presence of grazing and mowing. For each transect, in addition to points with coordinates, at least 1 photograph of each habitat should be taken to document the condition/quality of the habitat. Where species threats and/or habitat disturbances are identified, coordinates are also recorded and photographs are taken, and identified threats are detailed on the field form. At the end of the reading of the square, the total established number of pairs of each species is filled in. Nest Found Field Forms are completed for all nests found, regardless of bird group. Field forms are completed only for nests for which it can be determined which bird species they are. Coordinates of each established nest are also recorded, as well as data on the substrate on which it is located. The number of eggs or young, the number of adult birds in or around the nest is also noted.

Field form



Description of method, for example:

- The bird's flight height above ground level is estimated at the point of first detection and thereafter at 15-seconds intervals, with the aid of a count-down interval timer with an audible alarm.

During the migration observations, numerous activities were carried out within the study area, which significantly altered and damaged the available habitats of the species.

As of March 2023, surveys are planned for the end of May 2023 for the nesting bird species in the study area, namely:

As 8 routes are planned, which cover previously identified different types of habitats:

1. Forests - acacia, beech, elm and oak
2. Arable fields
3. Open spaces resembling pastures

Ultimately, these habitats are significantly altered and the distribution for monitoring breeding birds is altered.

The territory of the power plant is partially used by migratory birds, as a place to rest and even search for food, in which the arable areas included in the landfills intended for the construction of the power plant, as well as the vegetation - trees and bushes on their periphery, are preferred:

- Cultivable areas - fields, as resting and foraging areas
- Strips of trees and bushes, as places mainly for rest
- Tree vegetation has remained immediately next to the fence of the territory planned for the construction of the solar plant.

6.1.1.2.1.3. Wintering birds survey

Description of the method

It is carried out using a standard methodology, including counting birds through binoculars, spotting scopes and camera photography, and counts species by observing behaviour and how they use the territory.

The numbers of wintering birds are recorded by the method of complete counting from standard, predetermined observation points. The methodology requires one visit to each location each winter in the period November 2023 – February 2024.

One of the most important principles in the methodology is standardization, so that observations are made from the same points and using the same field method of observation, thus increasing the reliability of comparisons of abundance from site to site and from year to year. Standardization is ensured by the use of strictly defined forms of recording.

Types of data collected in the field

The data collected are filled in a field diary and standard forms. In the field diary, the date, the names of the participants, the characteristics of the used optics and vehicles are recorded. Meteorological conditions (MTO) are recorded at the beginning of the observations and include: air temperature (To C), wind direction, wind strength (Beaufort scale); visibility (m); presence of fog/haze/other reason for reduced visibility; precipitation (snow/rain and their intensity); clouds (cloud type and % coverage) presence of snow cover/icing (MTO is added only if a sudden change in weather has occurred). The following information is recorded for individual locations:

- Time of observation - the astronomical time is recorded
- Species - write down the Latin name of the species - *Anas strepera*; if it is impossible to determine the species due to poor conditions or considerable distance it is recorded only to genus – e.g. *Anas sp*.
- Number of individual species. For mixed flocks of waterfowl, the number of individual species shall be recorded or, as a minimum, the percentage of individual species shall be recorded.
- For birds in flight, the main direction of the flight and its trajectory of movement are noted - the main directions are used - north, south, east, west, north-east, north-west, south-east, south-west, and are recorded with the Latin abbreviations.

Data from the field log are processed and entered into standard forms containing the following information:

- Geographical area;
- Name of the location from which the information was collected,
- Date;
- Meteorological conditions - air temperature (To C), presence of snow cover, snowfall, rain, etc.;
- Species - write down the Latin name of the species - Anas strepera; if it is impossible to determine the species due to poor conditions or considerable distance it is recorded only to genus – e.g. Anas sp.;
- Number of individuals of each species;
- Additional notes;

Method of data collection and recording

- The coordinates of the places from which information is collected are taken using a GPS receiver pre-calibrated for the needs in decimal degrees.;
- The time of the observations is recorded in astronomical time;
- The species is recorded with its Latin name written in full - e.g. Anas strepera. If the conditions of the observation do not allow the determination of the species, it is written down to the genus - e.g. Cygnus sp.
- The exact number of each species is recorded, if this is not possible an estimate of the number is recorded, and this is noted in the field log. If possible, the age and gender structure of the flocks is also recorded.

- Bird behaviour is categorized into the following types – feeding, resting, restlessness, comfort behaviour (cleaning feathers, bathing when there is water in the levels, others). The behaviour of the main part of the birds is recorded. If there is a concern, its source is recorded if it is identifiable;

Purpose

The purpose of the specific task is to determine the mid-winter numbers of bird populations using the territory of the investment proposal.

Expected results:

The numbers of the populations of the birds wintering on the territory of the investment proposal have been determined: the state and trends in the numbers of the wintering populations; the state of the main places for birds to congregate and for what biological needs they use the territory.

For research purposes, three stationary GPS points have been determined:

1. W – N44,055926 E27,164477
2. M1 – N44,054984 E27,182204
3. E - N44,054458 E27,191519

Map with location of winter bird monitoring points

Schedule for wintering bird monitoring visits

Winter season	Number of hours per vantage point	Total number of hours covered during season (Vantage Points)
20.11.2023 21.11.2023 22.11.2023	**6**	**18**
01.12.2023 04.12.2023	**6**	**12**
18.01.2024 19.01.2024 24.01.2024 31.01.2024	**6**	**24**
14.02.2024 15.02.2024 20.02.2024	**6**	**18**
	24	**72**

6.1.1.2.2. Methodology for monitoring BATS

Bulgaria has a uniquely high diversity of bats. Of the 35 species established within the continent, 33 species are known in our country. Among the reasons for this high species diversity are our transitional geographical position, the mosaic of diverse habitats starting from sea level and reaching over 2900 m, the presence of still preserved sites in many parts of the country, extensive agriculture in mountainous and semi-mountainous areas, the presence of over 5,400 caves and the rich diversity and abundance of insects. Bat diversity is highest in the zone from 100 to 400 m, where 17–20 species live in relatively small areas.

Approach to performing fieldwork and analytical work. Planning.

Tracking through recordings with Ultrasonic Detectors is one of the specialized ways to record and identify bats by the sounds they make. This requires an ultrasound detector, a good auditory memory, special training and practice. The method is suitable for detecting the activity of species that emit a strong and targeted signal. Ultrasounds captured in the field are recorded on digital media and analyzed using special software. The method guarantees "minimal direct impact" on the population and individual specimens. The principle of the ultrasonic detector is that it converts bat sounds that are not perceptible to the human ear into ones that can be heard by humans. There are three types of detectors: heterodyne, frequency division, time expansion, real time. The bat tracking team consists of experts that are equipped with the following:

1. Bat detectors – AudioMoth 1.2.0, EchoMeter Touch 2, Transect Tranquuility и NE612-receiver, Petterson D1000x;
2. Laptop
3. GPS equipments

4. Endoscope
5. Thermo-hygrometer;
6. Research protocols;
7. Record form;
8. Cars

Recordings for the present study were made with an Ultrasound Detector - AudioMoth 1.2.0 and EchoMeter Touch 2 – real time, Transect Tranquuility time expansion detector, and the data processing was done with a software product „BatSound" and Kaleidoscope Pro v.5.4.8.

Recordings with the Detectors are made in a time period of 20 min to 1 hour after sunset for the interval from 20:00 to 06:00 (depending on the season) in the dark part of the day when bats are active, applying both spot, and transect method.

Transects records

Transects are performed according to the method iBats - https://www.bats.org.uk/our-work/national-bat-monitoring-programme/past-projects/ibats.

One transect was defined, which covers the runways of the former airport, and thus all possible habitats of the bat species that are available on the territory of the FEC fall within the scope of the study. The same is about 5000 meters long.

The same is carried out using the methodology applied in Indicator Bats Program (http://www.ibats.org.uk/), as the movement is carried out by a car moving at 25 km/h, in which case a recording is made again with Transect Tranquuility time expansion detector or EchoMeter Touch 2 for Android.

After the completion of the transect, recording of sounds from a point is applied, namely: N 44.055134° E 27.182238°, with detector Transect Tranquuility time expansion detector or EchoMeter Touch 2 for Android.

Spot records in suitable habitats

The method for studying the ultrasonic activity of bats was applied, using the **AUDIOMOTH 1.2.0** device, which is static and 6-8 locations were determined, where they were placed in the period March - October 2023.

Point-placed AudioMoth 1.2.0 detectors at 8 locations, applying the habitat principle - hedgerows next to fields, single trees near airport runways and fields. It should be noted that at the time of the survey, felling and clearing of trees and bushes is taking place in all parts of the affected area, which will automatically affect the diversity, numbers and activity of bats in the area of the airport.

The method for studying the ultrasonic activity of bats was applied, using the **AUDIOMOTH 1.2.0** device, which is static and 8 locations were determined, where they were placed in the period March - May 2023.

Point-placed AudioMoth 1.2.0 detectors at 8 locations, applying the habitat principle - hedgerows next to fields, single trees near airport runways and fields. It should be noted that at the time of the survey, felling and clearing of trees and bushes is taking place in all parts of the affected area, which will automatically affect the diversity, numbers and activity of bats in the area of the former airport.

№	AUDIOMOTH	X	Y
1	AM01	44.050598°	27.162190°
2	AM02	44.056840°	27.165634°
3	AM 03	44.056376°	27.176812°
4	AM 04	44.056118°	27.186516°
5	AM 05	44.059062°	27.198644°

№	AUDIOMOTH	X	Y
6	AM 06	44.054240°	27.191086°
7	AM 07	44.053313°	27.182418°
8	AM 08	44.055127°	27.173260°

After the constructor cut down the vegetation the experts decided to reduce the number of AudioMoth devices to 6.

AudioMoth 1.2.0 locations in 6 points in the period from May-October:

№	AUDIOMOTH	X	Y
1	AM01	44.050598°	27.162190°
2	AM02	44.056840°	27.165634°
3	AM 03	44.056376°	27.176812°

№	AUDIOMOTH	X	Y
4	AM 04	44.056118°	27.186516°
6	AM 06	44.054240°	27.191086°
8	AM 08	44.055127°	27.173260°

Recordings with the AM Detectors are made in a time period of 20 min to 1 hour after sunset for the interval from 20:00 to 06:00 (depending on the season) after nightfall when bats are active, applying both methodology spot (fix points AM) and transect method.

The device settings are:

Firmware : AudioMoth-Firmware-Basic (1.8.0)
Time zone : UTC+3
Sample rate (Hz) : 96000
Gain : Medium
Sleep duration (s) : 5
Recording duration (s) : 55
Active recording periods : 2
Recording period 1 : 00:00 - 03:00 (UTC)
Recording period 2 : 17:00 - 24:00 (UTC)
Filter : High-pass (12.0kHz)
Trigger type : -
Threshold setting : -
Minimum trigger duration (s) : -
Enable LED : Yes
Enable low-voltage cut-off : Yes
Enable battery level indication : Yes
Always require acoustic chime : No
Use daily folder for WAV files : No
Disable 48Hz DC blocking filter : No
Enable energy saver mode : No
Enable low gain range : Yes
Enable magnetic switch : No
Enable GPS time setting : Yes

For the recorded ultrasounds, a Protocol is filled out, which contains the following minimum information:

DATA COLLECTION FORM WITH ULTRASOUND DETECTOR						ID №:			
Team leader name:		Field assistent:				Others:			Mission №
Date:		Work line begin/end:				N2000 code		N2000 name zone:	
Name of the place Populated place:		Forest: deciduous, coniferous, mixed	Weather conditions	Wind: none, weak, moderate, strong	Specific information	Metho des	TE (time-expansion)		Sound interval(ms):
		Undergrowth: yes/no		Rain: none, light, moderate, heavy		Detector model:			
GPS coordinates: Name point/transect:				Cloudiness: 0, 0-30%, 30-60%, 60%-100%		Recording model:			Record: Auto/Manual
N	E	Transect length (m):		FC/humidity% begin: /		Transect/Point Notes:			
N (for final point at transect)	E (for final point at transect)			FC /humidity% end: /					
Altitude (min и max):									
Name of the place		water bodies: puddle, lake, stream, river, dam, swamp, other:				GPS model:		Polygon №:	
Established species:									
GPS point	Hour/min/sec	Species group	Notes on observed bat behavior and coloration, activity, sound file name, and more.						
Notes - habitat changes; notes on observed bat behavior; notes on approach and access to transects, other notes. Also note references to other data, protocols and forms.									

GPS devices combined with portable computers were used to identify the geographic location of the measurement points.

The map of the area is obtained through an Internet connection with Google Earth, which provides real-time access to a three-dimensional model of the Earth with detailed satellite images of any point on the Earth's surface.

The current assessment of the impact of the project on bats is based on our own field surveys carried out during the period March-October 2023 which covers the migration period, as well as on the available literature and archival information on bat presence in the area. Benda et al. (2003).

For the overall study of the bat fauna, observation points and transects were marked and presented on map material and all the tables of identified bats in the project area are attached.

There are specific steps of actions that must be followed in order to correctly implement an assessment within the territorial limits of an investment proposal (IP):

STEP 1. Collection and analysis of available information

A. What information is available about the species composition of bats in the IP area?

Q. What information exists about habitats and landform features relevant to bats?

C. What information exists about the structural elements and characteristics of ecosystems in the IP area?

In the absence of detailed information about bats, a literature reference is made, or if it is not available, an assessment of available habitats in the studied territory is carried out.

If you only have habitat information, the apps help you get an initial idea of what to expect and look for in the field. When searching for available information on the habitats and features of landforms relevant to bats, the expert should focus on data on sites of high insect abundance, existing roosts, known flight corridors, and guiding linear landscape features such as roads, forest clearings, river courses with developed coastal vegetation, etc. Indirect information about potential bat migrations can be provided by data on documented bird migration routes.

STEP 2. Preliminary assessment of the need for additional studies to clarify the degree of risk and potential impact/impact resulting from the implementation of the IP

A. Evaluation of the relevance of the collected information from step 1. Analysis of step 1 (A+B+C).

Q. What bat species can we potentially expect in the IP area?

C. What is the possible function of the landscape features in the IP area during the different periods of the bat life cycle?

D. To identify potential conflicts resulting from the implementation of the IP, as well as direct negative impacts on individuals, populations or functional landscape elements of importance to bats.

STEP 3. Design and Conduct Research on Bats and Related Environmental Functional Elements

A. To determine adequate research methods.

C. To determine a representative period for conducting the survey

C. To determine the intensity of the study depending on the specificity of the objects and the season for research.

D. Conduct field surveys and gather up-to-date information. To interpret the collected information. Analysis of Step 1 (A+B+C) and Step 2 (B+C).

The periods of bat activity that are subject to assessment are the following:

• reproductive period (from the end of May to the end of July);
• period of active communications between summer refuges (June–August);
• activity of local populations (May–September);
• dispersion of colonies and beginning of autumn migrations (August–September);
•autumn migrations and establishment of territories and shelters for mating (September–October);
• spring migration (March–April).

Additional research should provide information on:

• the maximally complete species composition;
• characterization of landscape elements important for bats;
• presence, number and exact location of shelters;
• presence and location of flight corridors and the species that use them;
• presence and location of food habitats.

STEP 4. Final assessment of the impact of the implementation of the PP and measures to prevent, mitigate and compensate for the negative impact

A. To present the conservation status of the established species according to national and international legislation.

C. To determine the species at risk in relation to PP and mainly the potential danger of destruction of individuals and colonies.

C. To locate the habitats and refuges affected by the PP and to assess the main risk factors during the individual stages of the implementation of the PP.

D. To prepare recommendations to reduce the negative impact during the implementation of the IP and to propose alternative solutions for mitigating and compensating the damage

SHELTERS

Depending on the season, bats inhabit different shelters. In winter, all species live in shelters with a constant temperature between 2º to 10º C. Such conditions are most often found in water caves, flooded mine galleries and less often in the attics and basements of residential buildings. In spring and autumn they can be found in a wide variety of shelters where the temperature is variable or constant (e.g. abandoned and inhabited residential and industrial buildings, underground bunkers, galleries, drainage and ventilation shafts, pipes, chimneys, hollow pillars, small and large caves, chasms, rock niches, etc.). In the summer, bats prefer refuges with a higher temperature, where they breed. Colonial species are found in caves with large volumes and large entrances, so that at dusk hundreds or thousands of bats can fly out at once. Depending on their habitat preferences, bats are conditionally divided into four main categories:

• Cave-loving - breed and winter exclusively in caves and other underground shelters. They are mainly found in areas with karst, volcanic or sea caves. The number of colonies can reach 100–10,000 copies. in summer and from 50 to 100,000 specimens in winter.

• Forest - reproduce mainly in hollows, crevices and under the bark of trees; some species also winter in caves. They are found wherever there is a broad-leaved, mixed and less often pure coniferous forest that offers enough shelter and a food base. Their number in hollows is usually 10–50 individuals, but many colonies are more or less evenly distributed over a large area.

• Wetlands - due to their high biological potential and rich biodiversity, these are one of the most important feeding habitats for bats. These areas are especially important during the summer months when thousands of bats hunt above the water surface and are important participants in regional food chains. Most specimens dependent on water areas live in the immediate vicinity or within the boundaries of the areas themselves. They inhabit tree hollows, residential or industrial buildings, caves and other nearby shelters.

• Synanthropic – spend almost their entire life cycle in man-made shelters such as attics, basements, joints, manholes, chimneys, ventilation systems and elsewhere. They are found everywhere in villages, cities, resort towns and other urbanized areas. Colonies of some species vary from 5–20 individuals, of others 50 to 1000 individuals.

Some basic characteristics are known about the ecology of bats:

<u>Hunting (food) habitats</u>

All European bat species are insectivorous. They feed mainly on insects from the orders Coleoptera, Lepidoptera, Diptera, Orthoptera, etc., as well as other arthropods (spiders, centipedes). Individual species of bats hunt using different "strategies" - some fly high in open space, others gather insects from the surface of vegetation, others hunt insects from the water surface. In general, the main preferred types of hunting habitat for all species are open bodies of water (including slow-flowing rivers), riparian woody vegetation, forest edges and the forests themselves.

Flight corridors

Data on how bats navigate and what flight corridors they use to reach their hunting grounds or alternative roosts are extremely scarce. It is assumed that landmarks can be various natural and artificial "linear" elements of the landscape, such as rivers, canals, rows of trees, clearings in the forest, etc.

Assessment of Baseline Conditions

Several potential habitats for both refuges and foraging sites have been identified.

1. Forests - acacia, plum, walnut, beech, elm and oak - at the northern and southern borders of the landfill.
2. Arable fields
3. Open spaces resembling pastures - mounds of earth that were used to store equipment. Occupied by grass formations and tree and shrub vegetation
4. Abandoned buildings

Several buildings have been identified on the ground that were part of the airport infrastructure but given that the ground clearance activities started in the month of February 2023, and we started monitoring at the end of March 2023 - 90% of them were already demolished.

6.3.1. Methodology (OHTL)

Between 16 and 17 March 2024, a complete walkover was carried out along the Pelikan OHTL and Dorostol OHTL route incorporating a buffer from the route up to 100 meters on each side of the planned OHLT centre line. The species composition of the vegetation on the territory was observed and their coverage was determined. Within the scope of the Pelikan OHTL and Dorostol OHTL routes, no natural habitats subject to protection have been established in the protected area Ludogorie - Srebarna (SCI) BG0000169, as a Protected Area under the Habitats Directive. It was found that within both routes only arable land planted with rapeseed and wheat is available or is currently only arable land. The boundaries of the individual territories occupied by agricultural crops are reported, but no species or habitats that are subject to protection in the protected area Ludogorie - Srebarna (SCI) BG0000169 have been identified. The points for joining the power lines of the available and built by the national energy operator route for 110 kV were also visited. As a conclusion, it can be summarized that natural habitats are not available along the routes of the two project routes, and such habitats will not be affected in neighboring territories either, since they are not available, except for arable land planted with agricultural crops.

6.4. Survey Findings (main site)

The results pre and post clearance are presented in subsequent sections where collected. The following maps illustrate the areas where survey work was focussed.

Figure 33: Arable fields (blue) and asphalt roads (inc. airport runways) (pink)

Figure 34: Buildings at the airport tower (orange)

Figure 35: Strips of trees in a north and south direction from the boundary of the property (yellow area)

A full description of the biodiversity monitoring work (spring and summer 2023) is provided in Annex III – Biodiversity Baseline report.

6.4.1. Habitats

During June 2023, all vegetation was removed from all terrains intended for the construction of the project by the previous owner as a pre-condition to acquiring the land. This led to a complete change of the species composition observed during the summer survey work (August 2023).

The habitat under the PV Project Site and OHTL routes are summarised in Table 19 Considering the pre-site clearance status, all habitats directly impacted are heavily disturbed through airport operations or agricultural activity and are considered modified habitats per IFC PS6.

The following maps show pre-and post-clearance habitat at the survey site

Figure 36: Pre-clearance habitat map (main site)

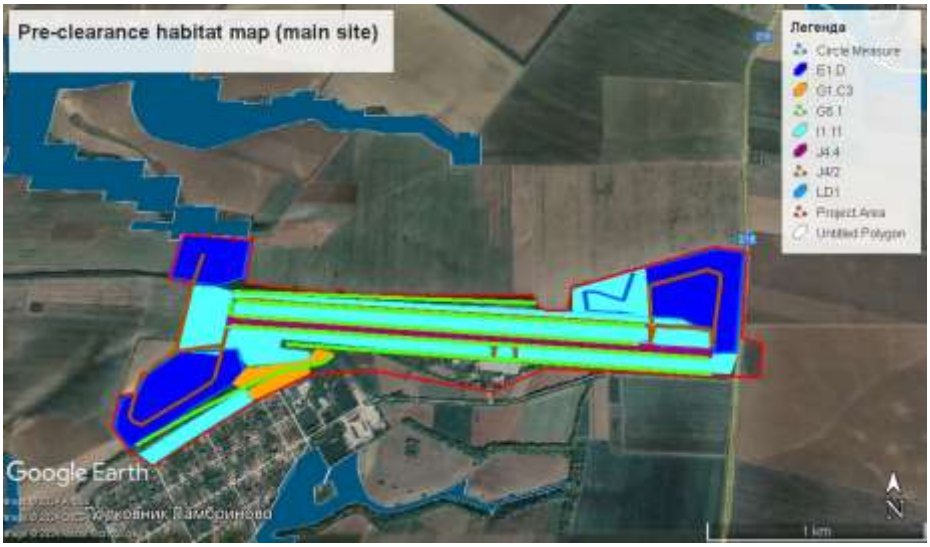


Figure 37: Post clearance habitat map (main site)

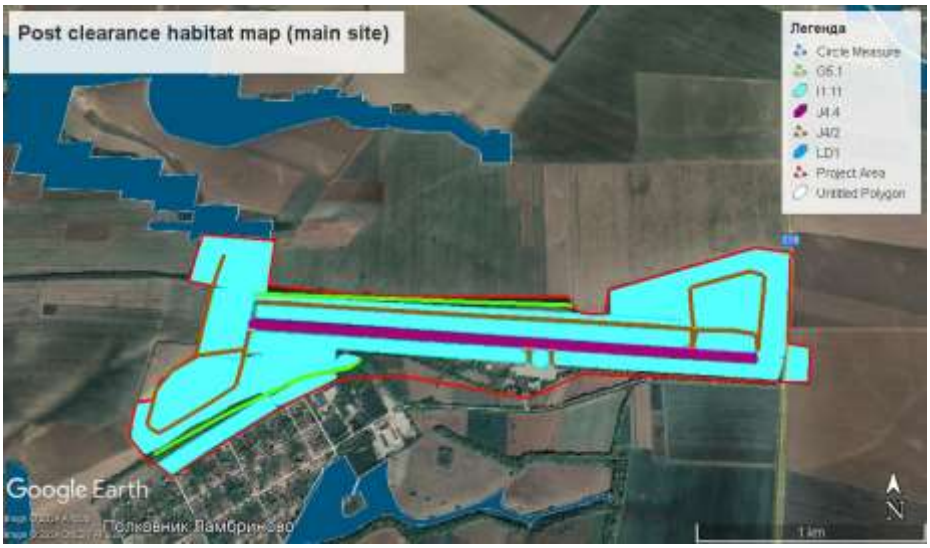


Figure 38: Habitat map – OHTL routes (Pelikan and Dorostol)

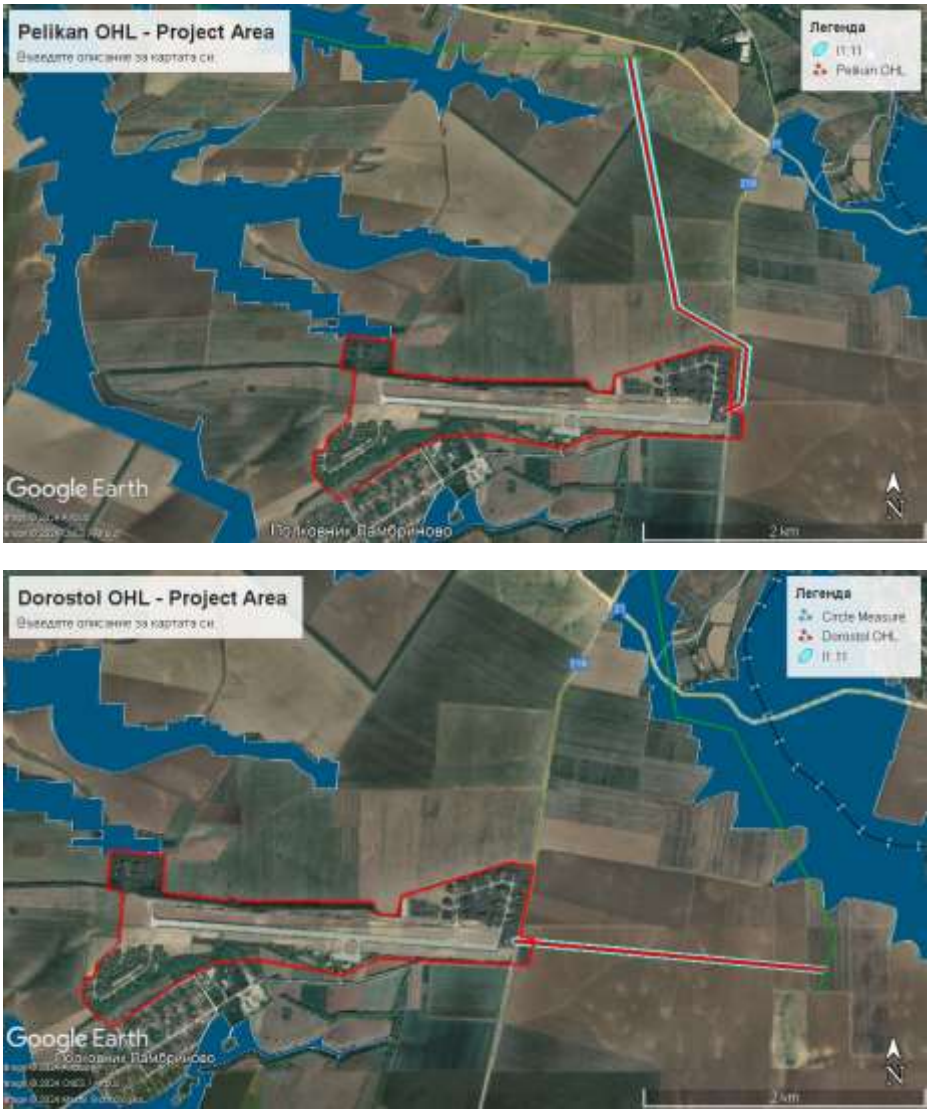


Table 19: Habitats in the direct impact area (PV Site and OHTL ROW) (preclearance)

№	Habitat type	EUNIS Annex 1 code[26]	Main Site (pre-clearance)	OHTL (both)
1	Unmanaged xeric grassland	E1.D	Yes	Yes
2	Robinia plantations	G1.C3	Yes	No
3	Lines of trees (predominantly acacia)	G5.1	Yes	Yes
4	Airport runways and aprons	J4.4	Yes	No
5	Large-scale intensive unmixed crops (>25ha)	I1.11	Yes	Yes
6	Road networks	J4/2	No	Yes

In the immediate surroundings of the PV Site there is a small village to the south, outer edge of the terrestrial and freshwater inland waterway (Ludogorie - Srebarna protected area), and agricultural land. All but the protected area habitat (set back approximately 30 m) is considered to be modified habitats. Orchards are available within the boundary of the project area. There are orchards only in the southern direction of the territory between the airport ramp and the western part of the territory. They are marked on the map and are within the site boundary which historically has been a secure area and therefore these orchards only serve the landowner and are not common orchards available to the wider community. The orchard has not been removed and it is basically separated by a fence.

Refer to **Error! Reference source not found.** for land use mapping. Representative vegetation i n the Project area (pre and post clearance) are provided in the figures below

[26] https://eunis.eea.europa.eu/

Figure 39: tree and shrub vegetation around the runway (April 2023)

Figure 40: Robinia Plantations

Figure 41: Areas occupied by grassy areas represented mainly by ruderal plant species (March 2032)

Figure 42: Photo from field surveys as of May 2023 in grassy areas, represented mainly by ruderal plant species, the so-called in Bulgarian - "buksi"

Figure 43: Airport runway (preclearance – April 2023)

Figure 44: Airport runway (post clearance) (May 2023)

Figure 45: weedy and ruderal vegetation (post clearance)

Figure 46: Final removal of vegetation

The following figures illustrate the land use categorised as Habitat I1.11 for the Pelikan OHTL routes.

Figure 47: Start point – 067 - N44.05985 E27.19905 – rape

Figure 48: Start point – 067 - N44.05985 E27.19905 – rape

Figure 49: 2. point – 068 - N44.05993 E27.19886 - crossing point of the road Silistra – P. Lambrinovo

Point – 069 - N44.06257 E27.19367 - area sown with wheat

Point – 070 - N44.06986 E27.19369 - boundary between an area sown with wheat and arable land prepared for sowing

Point 072 - N44.07904 E27.19203 - boundary between an area sown with wheat and arable land prepared for sowing

	
Point 073 - N44.08519 E27.19163 - Pelikan OHTL endpoint to 110kV grid connection	Start point 074 - N44.05446 E27.19942 - beginning of Dorostol OHTL - arable land
	
Point 075 - N44.05372 E27.21203 – border between arable land and rape field	Point 076 - N44.05262 E27.22331 - boundary between a field of canola and wheat

	
Point 077 - N44.05268 E27.22477 - end point for connecting Dorostol OHTL routes to the 110 kV network	

6.4.2. Flora

Preclearance, the grass cover on the properties consists of a small number of calciphilous and ruderal species. Loose communities of annual and perennial herbaceous species are observed on the nutrient poor. Clusters with low coverage of: Galium aparinae are observed; Cynodon dactylon; Arabis turrita; Lotus corniculatus; Echium vulgare; Chrysopogon gryllus; Filipendula vulgaris; Senecio vernalis; Teucrium chamaedrys; Sanguisorba minor; Eryngium campestre; Festuca valesiaca; Taraxacum officinale; Galium verum; Poa angustifolia; Achillea millefolium; Artemisia austriaca; Xeranthemum annuum etc. Within the boundaries of the areas planned for the construction of the Photovoltaic Project(PP), successional processes are observed, which have led to changes in the agrarian landscape, and these areas are grassed or covered with trees (forested mainly acacia - 90% and self-settled species, such as: walnut, elm, plum , gorse, hawthorn and others) and shrubs (blackberry, rose hip).

Post clearance there has been a complete removal of the grass vegetation from the prepared areas, and this caused a complete change of the microhabitats that exist despite human intervened in the territory. On abandoned arable lands and fields there is secondary weedy and ruderal vegetation, and during secondary successions in different directions, serial plant communities were formed, which can be included in different successional orders. The species Centaurea rhenana Boreau, knotweed Torilis (Torilis nodosa (L.) Gaertner), reed (Cynodon dactylon (L.) Pers.), ordinary blue gall (Cichorium intybus L.)), bristly heather (Elymus hispidus (Opiz.) Meld.), yellow gorse (Anthemis tinctoria), bromus inermis Leysser, thistle (Carduus acanthoides L.), common cornflower (Cirsium vulgare L.), hop alfalfa (Medicago lupulina L.), yellow reseda (Reseda Lutea L.), common gorse (Chondrilla juncea L.), small burdock (Arctium minus (Hill.) Bernh.). Bromus sterillis L., Chenopodium album L., Euphorbia helioscopia L., Mouse barley (Hordeum murinum L.), Lactuca seriola L., Inconspicuous mallow (Malva neglecta Wall.), common sedge (Senecio vulgaris L.), medium star (Stellaria media (L.) Vill.) and others. No habitats have been identified that can be classified as conservation significant and subject to protection under the Habitats Directive 92/43/EEC.

6.4.3. Invertebrates

Invertebrate animals in Northeastern Bulgaria number over 1000 species, which belong to 3 types, 6 classes, 22 orders and 120 families. For this ESIA, transect surveys were conducted for diurnal butterflies (lepidoptera D), nocturnal butterflies (lepidoptera N), carabidae, coloptera, mantodea, odonata. 116 insect species from 97 genera of 42 families were identified, which belong to eight orders of the class Insecta – Coleoptera, Hemiptera (with the suborders Heteroptera and Homoptera), Hymenoptera, Diptera, Neuroptera, Orthoptera, Thysanoptera and Lepidoptera. The species composition is determined by the cereal crops and orchards available in the area - mainly represented by peaches, plums, cherries and apricots. Corn and sunflower leafhopper species predominate in the area. In the middle of June 2023, all vegetation was removed from all terrains intended for the construction of the FPP. This led to a complete change of the species composition and the significant reduction of species. In mid-August 2023, the vegetation on the areas designated for the construction of the PV Site partially recovered, but the species composition has not recovered at this time.

6.4.4. Amphibians and reptiles (Herpetology)

Field work consisted of transect works in the direct AOI (PV site). The methodology selected consisted of field survey during monitoring visits in March, April, May and June 2023 during which time the Project area was searched exhaustively for evidence of all possible herpetology that could occur in the Project area. The transects followed habitats suitable for the species(s) at the discretion of the expert. All traces of herpetological activity found (turtle holes, characteristic tracks/tracks of land turtles) that can be reliably linked to a species were also reported. In addition, active searching (under rocks, stumps and other shelters) was also performed.

Bulgaria is inhabited by 20 species of amphibians and 35 species of reptiles, the majority of which are represented by stable populations, thus ranking among the richest European countries in terms of herpetological fauna. According to field inspections, no habitats have been established that represent temporary or permanent sources of fresh water or that similar ones are available within a radius of about 1000 meters.

Most of the reptile species found in Bulgaria have been categorised as least concern or not evaluated. Four species are near-threatened (the European pond turtle, meadow lizard, four-lined snake and Hermann's tortoise), two species have been designated vulnerable (the meadow viper and spur-thighed tortoise) , with the spur-thighed tortoise identified in L-S protected area designation. In addition there are two species are classified as endangered (the loggerhead sea turtle and green sea turtle, which are not considered relevant for this project. Of these, only the meadow lizard (IUCN NT), four-lined snake (IUCN NT) and Hermann's tortoise (IUCN NT) could potentially be present at the site, however none of these were observed during the field work (refer to Table 20). During the survey three species of amphibians and six species of reptiles were found. None of these species has an IUCN or Bulgarian red book listing of VU or above. None are listed under the Nature Directives or listed as species under Ludogorie – Srebarna Protected area designation.

Table 20: Observed amphibians and reptiles at the site

Class **Amphibia** Order **Anura**		DIR	Bern	IUCN /	**BIODIVERSITY**	Habitat
family **Bufonidae**	European green toad I*Bufotes viridis)*			IUCN [LC]		Arable fields and asphalt roads (airport runways)
family	**eastern**			IUCN [LC]		Strips of
family **Ranidae**	Agile frog *(Rana dalmatina)*			IUCN [LC]		Strips of trees in a north and south direction from the boundary of the property
Class **Reptilia** Order **Squamata**						
family	*Podarcis*			IUCN [LC]		Arable
	Lacerta			IUCN [LC]		Strips of
	Ablepharus			IUCN [LC]		Strips of
family	*Anguis*			IUCN [LC]		Arable
family	*Dolichophis*			IUCN [LC]		Strips of
	Zamenis			IUCN [LC]		Strips of

6.4.5. Birds

A bird migration survey and breeding birds was undertaken during spring and summer 2023. The survey work included visual surveys of the migration of flying birds is carried out by direct observations from predetermined permanent stationary points (vantage points - VP), daily throughout the migration period, during the daylight hours (7:00 - 18:00 astronomical time)[27] and transect surveys for breeding birds[28]. The area is not a typical bird migration corridor but is located on the periphery of the Via Pontica migration route. During the spring monitoring of 2023, 55 species of birds were recorded.

For the group of waterfowl, the described terrains are not attractive either for searching for food or as places to rest and spend the night, but there was one observation of Actitis hypoleucos on the

[27] In the period March 15 - May 15, the survey is carried out until 17:00 astronomical time, and in the period October 1 - 31, the survey is carried out until 16:00 astronomical time, due to the reduced length of the day

[28] The detailed methodology is described in biodiversity baseline - Appendix III.

runway in the month of April 2023. The territory is not of essential importance for the migration of the established species of birds. Only C. ciconia can be determined to be in an important place of the common migration route for the species along the Via Pontica route. The surrounding agricultural lands and especially around the land that is outlined in the area are of greater importance, since there they find warm currents (thermals) that allow them to gain height on the one hand, and to use the surrounding arable lands as resting places /night and looking for food.

In Autumn, compared to the spring migration, in which 55 species were recorded and significantly lower numbers of individuals, in autumn 2023 (in progress), although there was a significant reduction in possible habitats that could be used by migrating birds, such as resting places, sought after of food and lodging, which have changed as a result of the activities of cleaning the territory from unwanted forest, shrub and grass vegetation, there is actually even an increase in the number of individuals of some species,

Table 21: Target Species and observations by Flight Activity Surveys (March pre-clearance, May 2023 / Autumn 2023)

№	*Common Name*	*Target Species*	IUCN	EUNIS	Number (Mar 2023)	Autumn (2023)	Notes
1	Eurasian (E) goshawk	*Acc. gentilis*	LC		2		
2	E. Sparrow hawk	*Acc. nisus*	LC		4		*1
3	common sandpiper	*Actitis hypoleucos*	LC		1		
4	long-tailed tit	*Aegithalos caudatus*	LC		1		
5		*An. campestris*	LC		1		
6	mallard	*Anas plathyrhynchos*	LC		5		
7	common swift	*Apus apus*	LC		19	78	
8		*Al. arvensis*			-	48	
9		*Acc. brevipes*			-	2	
10	alpine swift	*Apus melba*	LC		16	2	
11	lesser spotted eagle	*Aq. pomarina*	LC		26	89	
12		*An. campestris*			-	6	
13	grey heron	*Ar. cinerea*	LC		5		
14	Eurasian Buzzard	*B. buteo*	LC .		41	68	
15	long-legged buzzard	*B. rufinus*	LC		-	1	
16	Western marsh harrier	*C. aeruginosus*	LC		1	1	

№	*Common Name*	*Target Species*	IUCN	EUNIS	Number (Mar 2023)	Autumn (2023)	Notes
17	European goldfinch	*C. carduelis*	LC		40	73	
18	white stork	*C. ciconia*	LC		1140	1041	do not use the territory as a place to rest and 15search for food
19	hawfinch	*C. coccothraustes*	LC		-	2	
20	Carrion crow	*C. corone*	LC		15		
21	Hen harrier	*C. cyaneus*	LC		2	1	*2
22	Rook	*C. frugilegus*	LC		121	1	
23	Jay	*G. garullus*	LC		2		
24	Western jackdaw	*C. monedula*	LC		3	14	
25	Black stork	*C. nigra*	LC		2	1	
26	Swan	*C. olor*	LC		8	-	
27	common wood pigeon	*C. palumbus*	LC		42	5	
28	Montagu's harrier	*C. pygargus*	LC		1	-	
29	western house martin	*D. urbicum*	LC		94	1455	Does not stop in territory
30	saker falcon	*F. cherrug*	EN		1	-	
31	Eurasian chaffinch	*F. coelebs*	LC		67	155	
32	peregrine falcon	*F. peregrinus*	LC		1	-	
33	Common kestrel	*F. tinunculus*	LC		3	1	*1
34	**red-footed falcon**	***F. vespertinus***	**VU**		**8**	**6**	***1**
35	Crested lark	*G. cristata*	LC		22	81	
3136	White tailed eagle	*H. albicilla*	LC		1	-	Uses site for feeding migration
32	barn swallow	*H. rustica*	LC		48	-	
33	booted eagle	*Hieraaetus pennatus*	LC		1	-	
34	red-backed shrike	*L. collurio*	LC		1	-	

№	*Common Name*	*Target Species*	IUCN	EUNIS	Number (Mar 2023)	Autumn (2023)	Notes
35	white wagtail	*M. alba*	LC		231	2	
36	European bee-eater	*M. apiaster*	LC		219	1593	Does not stop in territory
37	calandra lark	*M. calandra*	LC		55	33	
38		*M. flava*	LC		21	9	
39	Black Kite	*M. migrans*	LC			1	
40	Red Kite	*M. milvus*	LC			1	
41		*O. oriolu*	LC			6	
42	European honey buzzard	*P. apivorus*	LC		4	62	
45	osprey	*P. haliaetus*	LC		1		
46	Pigeon	*P. columbus*	LC			2	
47	great tit	*P. major*	LC			14	
48	Eurasian tree sparrow	*P. montanus*	LC		4	82	
49	great white pelican	*P. onocrotalus*	LC		2	-	
50	great cormorant	*Ph. carbo*	LC		4	-	
51	black redstart	*Ph. ochrurus*	LC		2	-	
52	common chiffchaff	*Phylloscopus collybita*	LC		2	-	
53	Eurasian spoonbill	*Platalea leucorodia*	LC		1	-	
54	sand martin	*R. riparia*	LC		103	-	
55	Finch	*S. spinus*				319	
56	**European turtle dove**	***S. turtur***	**VU**	**N**	**11**	**7**	
57	common starling	*S. vulgaris*	LC		40	340	
58	common starling	*St. vulgaris*	LC		16	-	
59	fieldfare	*T. pilaris*	LC		17	-	
60	Shelduck	*Tad. ferruginea*	LC		3	-	
61	green sandpiper	*Tringa sp.*			7	-	
62	eurasian hoopoe	*Up. epopps*	LC		4	-	
63	European honey buzzard	*B. buteo/P. apivorus*	LC		7	-	
					55	36	

Notes:
**1 - roosts in the trees at the northern and southern border of the airport, where trees are available*
**2 - fly relatively high between 100 to 600 meters high and do not use the territory*

A total of 31 species of nesting birds was identified at the site. All species are classed as least concern (IUCN LC).

Table 22: Nesting bird species on the Project Site

№	Common Name	Species	Number, pairs	IUCN Red List of Threatened Species	National legislation Biodiversity Act, Annex 3
1.		*A. arvensis*	8	LC	+
2.		*C. canorus*	2	LC	+
3.		*C. palumbus*	5	LC	+
4.		*D. syriacus*	3	LC	+
5.		*E. rubecula*	3	LC	+
6.		*Em. hortulana*	4	LC	+
7.		*F. coelebs*	2	LC	+
8.		*G. cristata*	7	LC	+
9.		*G. glandarius*	3	LC	-
10.		*Jynx torquilla*	1	LC	+
11.		*L. collurio*	18	LC	+
12.		*Luscinia megarhynchos*	21	LC	+
13.		*M. flava*	11	LC	+
14.		*M. calandra*	17	LC	+
15.		*M. striata*	1	LC	+
16.		*O. oriolus*	9	LC	+
17.		*P. caeruleus*	3	LC	+
18.		*P. major*	8	LC	+
19.		*P. pica*	1	LC	-
20.		*Ph. colchicus*	3	LC	-
21.		*S. atricapilla*	1	LC	+
22.		*S. communis*	3	LC	+
23.		*S. decaocto*	1	LC	-
24.		*S. turtur*	7	LC	-
25.		*S. vulgaris*	18	LC	-
26.		*T. merula*	4	LC	+

Importantly for determining connectivity with the species of high conservation importance related to the Sredvana Lake Protected area, in particular the Dalmatian Pelican IUCN-VU] / BRB [Critically endangered CR [B1a+B2a+D] / CITES-I which is known to be present at Sredvana

Lake, this was not detected during the observations to date, leading to the possibility to conclude that migratory flocks or individuals of this species do not pass through the area during migration.

6.4.6. Bats

Bat surveys have been performed monthly during the months of March 2023 and October 2023. Surveys were performed using a combination of recordings (ultrasound bat detectors) during the periods 20 minute to on hour after sunset (~ 20:00) to sunrise (~06:00am). The field survey team performed transects following standard bat monitoring methodology as prescribed in ibats. [29] That transect covered the runway area (a total distance of approximately 5000 meters through the centre of the site). The same transect was followed applying the methodology in the Indicator Bats Program (http://www.ibats.org.uk/), where the movement is carried out by a car moving at 25 km/h, in which case a recording is made again with Transect Tranquillity time expansion detector or EchoMeter Touch 2 for Android. Spot checks were also performed for ultrasonic activity at eight locations using static monitoring devices[30]. A full description of the methodology applied is provided in Biodiversity Baseline Report (Volume III). In the territory where the construction of the PV Site is planned, the species diversity is relatively poor, considering that it is an agrocenosis and a former airport, which is crossed by small field protection belts and small forests, 90% of which are acacia. In the PV Site area there are no caves, forests of conservation importance and high hills terrains. The nearest cave is located in the area of the village of Bogorovo - Hajdushka, which is 10 km east of the PV Site. Table 23 summarises the findings to date.

[29] https://www.bats.org.uk/our-work/national-bat-monitoring-programme/past-projects/ibats

[30] It should be noted that at the time of the survey, felling and clearing of trees and bushes is taking place in all parts of the affected area, which will automatically affect the diversity, numbers and activity of bats in the area of the airport.

Table 23: Observed bat species in the Project area

№	Common Name	Observed Species	IUCN	EU habitats directive[31]	Bern Convention[32]	Bonn Convention[33]	UNEP/EUROBATS[34]	Mar 2023[35]	Apr	May[36]	Aug[37]	Sep	Oct	Notes
1	Western barbastelle	*Barbastella barbastellus*	VU	Annex II, Annex IV	Annex II, Revised Annex I of Resolution 6	Annex II	Relevant		X					
2	Noctule	*Nyctalus noctula*	LC	Annex IV	Annex II	Annex II	Relevant	X	X	X	X	X	X	migrant species
3	Lesser noctule	*Nyctalus leisleri*						X	X	X	X	X	X	migrant species
4	Kuhl's pipistrelle	*Pippistrellus kuhlii*	LC	Annex IV	Annex II	Annex II	Relevant	X	X	X	X	X	X	inhabiting buildings in the village of Lambrinovo
5	Nathusius' pipistrelle	*Pipistrellus nathusii*	LC	Annex IV	Annex II	Annex II	Relevant	X	X	X				migrant species[38]

[31] COUNCIL DIRECTIVE 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CONSLEG:1992L0043:20070101:EN:PDF

[32] Convention on the Conservation of European Wildlife and Natural Habitats (Bern) (ETS No. 104) https://www.coe.int/en/web/conventions/full-list?module=treaty-detail&treatynum=104

[33] Convention on the Conservation of Migratory Species of Wild Animals (Bonn) https://www.cms.int/en/node/3916

[34] Agreement on the Conservation of Populations of European Bat https://www.eurobats.org/official_documents/agreement_text

[35] Survey work at this time was heavily influenced by ongoing vegetation clearance works and very cold temperatures (March 2023)

[36] Earthmoving activity is still ongoing, weather conditions are optimal.

[37] Works for vegetation clearance had finished.

[38] The records of Pipistellus nathusi, we can consider as accidental and even an error in the determination (see Pocora, Irina & Pocora, Viorel. (2011)

№	Common Name	Observed Species	IUCN	EU habitats directive[31]	Bern Convention[32]	Bonn Convention[33]	UNEP/EUROBATS[34]	Mar 2023[35]	Apr	May[36]	Aug[37]	Sep	Oct	Notes
6	Common pipistrelle	*Pipistrellus pipistrellus*	LC	Annex IV	Annex II	Annex II	Relevant		X	X	X	X	X	
7		*Pipistrellus pygmaeus*	LC	Annex IV	Annex II	Annex II	Relevant			X	X		X	
8	Savi's pipistrelle	*Hypsugo savii*	LC	Annex IV	Annex II	Annex II	Relevant		X	X	X	X	X	
9	European free-tailed bat	*Tadarina teniotis*	LC	Annex IV	Annex II	Annex II	Relevant	X	X	X				migrant species
10	Natterer's bat	*Myotis nattereri*	LC	Annex IV	Annex II	Annex II	Relevant		X			X	X	
11	Grey long-eared bat	*Plecotus austriacus*	LC	Annex IV	Annex II	Annex II	Relevant		X	X	X	X	X	
12	Lesser horseshoe bat	*Rhinolophus hipposideros*	NT	Annex IV	Annex II	Annex II	Relevant		X	X	X			
13	reater horseshoe bat	*Rhinolophus ferrumequinum*	NT	Annex IV	Annex II	Annex II	Relevant		X	X			X	
14	Serotine	*Eptesicus serotinus*	LC	Annex IV	Annex II	Annex III	Relevant		X	x	X	X	X	

As a generalization of the results of the studies carried out during the migration, the conclusion indicates that there is no clearly separated migration route through the territory, and this is shown by the data that the activity of bats begins immediately after sunset and continues until around 10:00 p.m. Activity is reported again after 04:00 a.m. until sunrise, which indicates that the recorded bat activities are not due to a migration corridor over the areas planned for the construction of the PV project, but are probably the local populations in the area of the village of P. Lambrinovo and the area . The identified species are mainly from the synanthropic group, with a very small part from the cave-loving group, such as *Rhinolophus hipposideros* (4 individuals) and *Rhinolophus ferrumequinum* (2 individuals), which may be due to the presence of abandoned houses in the area of P. Lambrinovo or small local movements of local populations in the area of the Khrsovska Reka natural territory, which is located about 15-20 km east of the territory of the PV Site , and the recorded individuals are for the entire period of migration and expected around the existing strips of trees, where AM02, AM03 were placed.

For the species *Nyctalus noctula, Nyctalus leisleri and Pipistrellus nathusii*, which are considered to be typical migrants, it can be summarized that the established records are very few and can rather be determined to actually be due to local populations rather than migrating individuals, as there are synanthropic habitats for them in the nearby settlement - the village of P.Lambrinovo. By August 2023, the land works had eased. Result showed that the number of recordings had decreased, although species diversity seems to remain. Despite the removal of vegetation and the corresponding reduction in insect abundance between the spring and autumn survey work, the results indicate that the species use the territories to search for food or fly over them when moving to the neighbouring territories, which are agricultural lands growing wheat, corn and sunflower or orchards.

Figure 50:Bat survey transect (yellow)

6.4.7. Mammals

Photo traps and transects surveys were performed in the Project area at the eastern and western edge of a strip of trees mainly of acacia at the border. Field surveys documented sixteen mammal species occurring in the Project area as detailed in Table 24. No species of EU conservation importance were identified with only two spies listed in the Bulgarian Redbook.

Table 24: Mammals observed in the Project area

Ref	LATIN NAME	Common Name	DIR. 92/43	BERN CON.	IUCN Red list, ver.3.1 (2016)	RED LIST BG (2011)	BIODIVERSITY ACT (BDA), Bulgaria	Listed species under L-S Protected area
ORDER EULIPOTYPHLA								
Family Erinaceidae								
1	*Erinaceus concolor*	Southern, white-breasted hedgehog			LC		BDA- III	No
Family Soricidae								
2	*Crocidura leucodon*	Bicolored shrew		III[39]	LC			No
3	*Crocidura suaveolens*	Lesser, white-toothed shrew		III	LC			No
Family Talpidae								
4	*Talpa europaea*	European mole			LC			No
Order LAGOMORPHA Family Leporidae								
5	*Lepus europaeus*	European hare		III	LC			No
Order RODENTIA Family Muridae								

[39] Annex III are the ones for which the exploitation is authorized but regulated so as to ensure and maintain population at an optimal level.

Ref	LATIN NAME	Common Name	DIR. 92/43	BERN CON.	IUCN Red list, ver.3.1 (2016)	RED LIST BG (2011)	BIODIVERSITY ACT (BDA), Bulgaria	Listed species under L-S Protected area
6	*Apodemus agrarius*	Striped field mouse			LC			No
7	*Apodemus flavicolis*	Yellow-necked mouse			LC			No
8	*Apodemus sylvaticus*	Wood mouse			LC			No
9	*Mus musculus*	House mouse			LC			No
Family Arvicolidae								
10	*Microtus arvalis*	Common vole			LC			No
Family Sciuridae								
11	*Sciurus vulgaris*	Red squirrel		III	LC			No
Order CARNIVORA Family Canidae								
12	*Vulpes vulpes*	Red fox						No
13	*Canis aureus*	Golden jackal			LC			No
Family Mustelidae								
14	*Mustela nivalis*	Least weasel		III	LC		BDA- III	No
15	*Meles meles*	European badger		III	LC			No
Order Artiodactyla								
Family Cervidae								
16	*Capreolus capreolus*	Roe deer		III	LC			No

6.5. CRITICAL HABITAT ASSESSMENT

6.5.1. Available Information

The screening relies on project-specific documentation IBAT reports generated for the project, as well as publicly available databases and sources on habitats and species listed as the following:

- IBAT Report on Protected Areas and Key Biodiversity Areas (KBAs) – within a buffer of 1, 10 and 50 km, and potential CH triggers within 50 km of the SPP site - https://www.ibat-alliance.org/
- IUCN Red List of Threatened Species - https://www.iucnredlist.org
- BirdLife Data Zone - http://datazone.birdlife.org/
- European Red List of Habitats Part 2. Terrestrial and freshwater habitats - https://ec.europa.eu/environment/nature/knowledge/redlist_en.htm

6.5.2. Ecologically Appropriate Area of Analysis

In line with IFC's GN6, an Ecologically Appropriate Area of Analysis (EAAA) is required to be determined for the CHA, which is not only defined by the project's area of influence (AoI) but extends beyond as necessary to consider distribution of species and ecosystems based on ecological patterns, processes and functions that are necessary for maintaining them. The EAAA is the spatial area of analysis where the CH criteria and thresholds are applied.

For the scope of St Georges CHA, the EAAA has been defined as presented in Figure 51 based on the existing boundaries of the nearby Ludogorie-Srebarna Natura 2000 Site (Sites of Community Importance designated under the EU Habitats Directive) and habitat continuum. The PV site is in converted land, which had previously been used for the airport. The Natura 2000 Site was designated around the former airport, where the boundaries were delineated for Natural Habitat, excluding the airport footprint and surrounding agricultural land. Natura 2000 habitats therefore do not extend into the Project site. The EAAA constitutes a common area with overlapping requirements and distribution for multiple priority biodiversity values that are subject to this CHA, some of which are also associated with the Natura 2000 Site.

Figure 51 St Georges SPP Project EAAA defined for the CHA (yellow polygon) and the adjacent Ludogorie-Srebarna Natura 2000 Site (white polygons from https://www.ibat-alliance.org/)

Habitat Classification

IFC PS6 defines habitat as "a terrestrial, freshwater or marine geographical unit or airway that supports assemblages of living organisms and their interactions with the non-living environment". To meet IFC PS6 requirements, clients would have different obligations for different kinds of habitats. This enables to provide a better understanding of specific species and habitat requirements and establish meaningful management units to define a mitigation strategy. These habitat types are Natural, Modified and Critical, where Critical Habitat can be a subset of Natural or Modified habitats.

Project baseline data suggests that the main habitat types within the EAAA were as the following prior to vegetation clearance at the PV site:

- Unmanaged xeric grassland
- Robinia plantations
- Lines of trees (predominantly Acacia)
- Airport runways and aprons
- Large-scale intensive unmixed crops
- Road networks

The Unmanaged Xeric Grassland (E1.D) is the only habitat type that is considered to retain its primary ecological function based on the species composition and is classified as Natural Habitat prior to clearance.

6.5.3. Critical Habitat Determination

IFC PS6 defines Critical Habitat (CH) as areas with high biodiversity value. Both natural and modified habitats may contain high biodiversity values qualifying as Critical Habitat. While habitat types are defined by the degree of human-induced modification, this is not necessarily an indicator of the biodiversity value of a site. IFC PS6 CH criteria that form the basis of CHA are as follows:

Criterion 1: Critically Endangered (CR) and/or Endangered (EN) species

Criterion 2: Endemic or restricted-range species

Criterion 3: Migratory or congregatory species

Criterion 4: Highly threatened and/or unique ecosystems

Criterion 5: Key evolutionary processes

Potential CH triggers within the EAAA have been identified through an initial screening of available information as listed in Section 6.5.1. The list derived from the IBAT was refined using species-specific data. Species that occur in biomes and habitats outside the EAAA were excluded. Baseline data provided in the ESIA, together with other site-specific information, were used to form the list of potential CH trigger species as presented in Table 25. The following sections of this chapter present an assessment on the potential for CH designation against each of the five CH criteria.

Table 25 Potential Critical Habitat Trigger Species

Species	Common Name	IUCN Red List	Range-restricted	Migratory	CH Criterion
Reptiles					
Testudo graeca	Common Tortoise	VU	-	-	1b
Birds					
Falco cherrug	Saker Falcon	EN	-	ü	1a, 3a
Aquila heliaca	Eastern Imperial Eagle	VU	-	ü	1b, 3a
Falco vespertinus	Red-footed Falcon	VU	-	ü	1b, 3a
Streptopelia turtur	European Turtle-dove	VU	-	ü	1b, 3a
Haliaeetus albicilla	White-tailed Sea-eagle	LC	-	ü	3a
Hieraaetus pennatus	Booted Eagle	LC	-	ü	3a
Clanga pomarina	Lesser Spotted Eagle	LC	-	ü	3a
Falco tinnunculus	Common Kestrel	LC	-	ü	3a
Pernis apivorus	European Honey Buzzard	LC	-	ü	3a
Pandion haliaetus	Osprey	LC	-	ü	3a
Accipiter nisus	Eurasian Sparrowhawk	LC	-	ü	3a
Accipiter brevipes	Levant Sparrowhawk	LC	-	ü	3a
Buteo buteo	Eurasian Buzzard	LC	-	ü	3a
Buteo rufinus	Long-legged Buzzard	LC	-	ü	3a
Circus aeruginosus	Western Marsh-harrier	LC	-	ü	3a
Circus pygargus	Montagu's Harrier	LC	-	ü	3a

Species	Common Name	IUCN Red List	Range-restricted	Migratory	CH Criterion
Circus cyaneus	Hen Harrier	LC	-	ü	3a
Milvus migrans	Black Kite	LC	-	ü	3a
Milvus milvus	Red Kite	LC	-	ü	3a
Actitis hypoleucos	Common Sandpiper	LC	-	ü	3a
Anas platyrhynchos	Mallard	LC	-	ü	3a
Ardea cinerea	Grey Heron	LC	-	ü	3a
Ciconia ciconia	White Stork	LC	-	ü	3a
Ciconia nigra	Black Stork	LC	-	ü	3a
Cygnus olor	Mute Swan	LC	-	ü	3a
Pelecanus onocrotalus	Great White Pelican	LC	-	ü	3a
Phalacrocorax carbo	Great Cormorant	LC	-	ü	3a
Tadorna. ferruginea	Ruddy Shelduck	LC	-	ü	3a
Mammals					
Spermophilus citellus	European Ground Squirrel	EN	-	-	1a
Vormela peregusna	Marbled Polecat	VU	-	-	1b
Nyctalus lasiopterus	Giant Noctule	VU	-	ü	1b, 3a
Miniopterus schreibersii	Schreiber's Bent-winged Bat	VU	-	ü	1b, 3a
Nyctalus noctula	Noctule	LC	-	ü	3a
Nyctalus leisleri	Lesser Noctule	LC	-	ü	3a
Pipistrellus nathusii	Nathusius' Pipistrelle	LC	-	ü	3a

Criterion 1: Critically Endangered (CR) and/or Endangered (EN) Species

Species threatened with global extinction and listed as Critically Endangered (CR), Endangered (EN) and Vulnerable (VU) on the IUCN Red List are assessed against Criterion 1 thresholds, as such for CH to be triggered the EAAA must contain at least one of the following:

(a) Areas that support globally-important concentrations of an IUCN Red-listed EN or CR species (≥0.5% of the global population AND (≥5% reproductive units of a CR or EN species);

(b) Areas that support globally important concentrations of an IUCN Red-listed Vulnerable species, the loss of which would result in the change of the IUCN Red List status to EN and meet these thresholds;

(c) As appropriate, areas containing important concentrations of a nationally or regionally listed EN or CR species, trigger designation of critical habitat.

Potential Criterion 1 trigger species that are globally and/or nationally listed as CR, EN and VU (Table 25), were assessed against the sub-criteria thresholds. This included a review of each species and use of quantitative data, where available.

Globally EN species that could trigger sub-criterion 1a are the Saker Falcon and European Ground Squirrel. Only a single individual of the Saker Falcon was observed during the baseline surveys in March 2023. With no suitable breeding grounds, the EAAA is not likely to support more than ≥0.5% of the global population of the species. The European Ground Squirrel data comes from

IBAT, covering a wider area, but the species colonies were not identified during the baseline surveys making it unlikely to meet the threshold for Criterion 1a in the EAAA.

There are seven globally VU species that occur in the EAAA; the Common Tortoise, Eastern Imperial Eagle, Red-footed Falcon, European Turtle Dove, Marbled Polecat, Giant Noctule, and Schreiber's Bent-winged Bat, which are potential triggers for sub-criterion 1b. For a species to trigger sub-criterion 1b, the EAAA must hold an exceptionally important concentration of a globally VU species, which is not likely for any of these species.

Criterion 2: Endemic and/or Restricted-Range Species

IFC GN6 defines the term endemic as restricted-range, which refers to a limited extend of occurrence (EOO) as such:

For terrestrial vertebrates and plants, a restricted-range species is defined as those species which have an EOO less than 50,000 km2.

Form marine systems, restricted-range species are provisionally being considered those with an EOO of less than 100,000 km2.

For coastal, riverine and other aquatic species in habitats that do not exceed 200 km width at any point, restricted-range is defined as having a global range less than or equal to 500 km linear geographic span.

An area can be designated as CH, if it holds ≥10 percent of the global population size and ≥10 reproductive units of an endemic and/or restricted-range species. There are no endemic or restricted-range species identified in the EAAA based on available information.

Criterion 3: Migratory or Congregatory Species

Migratory species are defined as any species of which a significant proportion of its members cyclically and predictably move from one geographical area to another (including within the same ecosystem). Congregatory species are those, whose individuals gather in large groups on a cycle or otherwise regular and/or predictable basis according to IFC GN6. The sub-criteria thresholds are as the following:

(a) Areas known to sustain, on a cyclical or otherwise regular basis, ≥ 1 percent of the global population of a migratory or congregatory species at any point of the species' lifecycle.

(b) Areas that predictably support ≥10 percent of the global population of a species during periods of environmental stress.

Potential CH triggers under sub-criterion 3a are migratory bird and bat species that occur in the EAAA (Table 25). The EAAA is not associated with any particular areas associated with significant concentrations of migratory/congregatory species for any of the potential CH triggers to meet the threshold for Criterion 3.

Criterion 4: Highly Threatened or Unique Ecosystems

To identify highly threatened or unique ecosystems, IFC GN6 refers to the IUCN Red List of Ecosystems (RLE) where formal assessments have been performed, and if not to assessments that

use systematic methods at the national/regional level, carried out by government bodies, recognized institutions and/or other relevant qualified organizations. CH under Criterion 4 is triggered in:

(a) Areas representing ≥5 percent of the global extent of an ecosystem type meeting the criteria for IUCN status of CR or EN.

(b) Other areas, not yet assessed by IUCN, but determined to be of high priority for conservation by regional or national systematic conservation planning.

To determine likelihood of habitats defined in Section 0 to trigger CH, the European IUCN Red List assessments for terrestrial and freshwater ecosystems were used. Habitats of the EAAA are not considered as CR or EN according to the European RLE making them unlikely to meet Criterion 4a threshold, and there are no other areas that have not been assessed to meet Criterion 4b.

Criterion 5: Evolutionary Processes

Evolutionary processes are defined as structural attributes of a region, such as its topography, geology, soil, temperature, and vegetation and combinations of these variables can influence evolutionary processes that give rise to regional configurations of species and ecological properties. The significance of structural attributes in a landscape that may influence evolutionary processes are required to be determined on a case-by-case basis, and determination of habitat that triggers this criterion will rely on scientific knowledge.

Examples of spatial features associated with evolutionary processes include landscapes with high spatial heterogeneity, ecotones, edaphic interfaces, connectivity between habitats, and sites of demonstrated importance to climate change adaptation either for species or ecosystems. The review of existing data and literature did not identify a particular spatial feature associated with key evolutionary processes associated with the EAAA, thus Criterion 5 is not likely to be triggered.

6.6. LANDSCAPE CHARACTER AND VISUAL AMENITY

The location of the PV Site is within the territory of the village of P. Lambrinovo, 5 km south of the town of Silistra. Most of the Project Plots had the status of urbanized land plots, part of a former airport owned by the Bulgarian state at the time they were sold by the state. Two of the Project Plots (LP 586 and LP 904 with a total area of 41,901 sq.m.) however had the status or agricultural land.

The landscape character of the areas is dominated by the airfield apron (Figure 52) and agricultural plots in the north and south (Figure 53). There are no residential properties within the PV site area. The majority of the area was closed off to the public while it was operating as an airfield.

The following figures illustrate the landscape of the PV Site.

Figure 52: Runway on the Site

Figure 53: Agricultural land within the Project boundary

Figure 54: Landscape of the area

Figure 55: Landscape of the area

The character of the landscape is already affected by the presence by man-made constructions, field elevations, etc. and is considered to be modified habitat[40] as per IFC PS6[41]. The topography of the site is characterised as flat as illustrated in Figure 56.

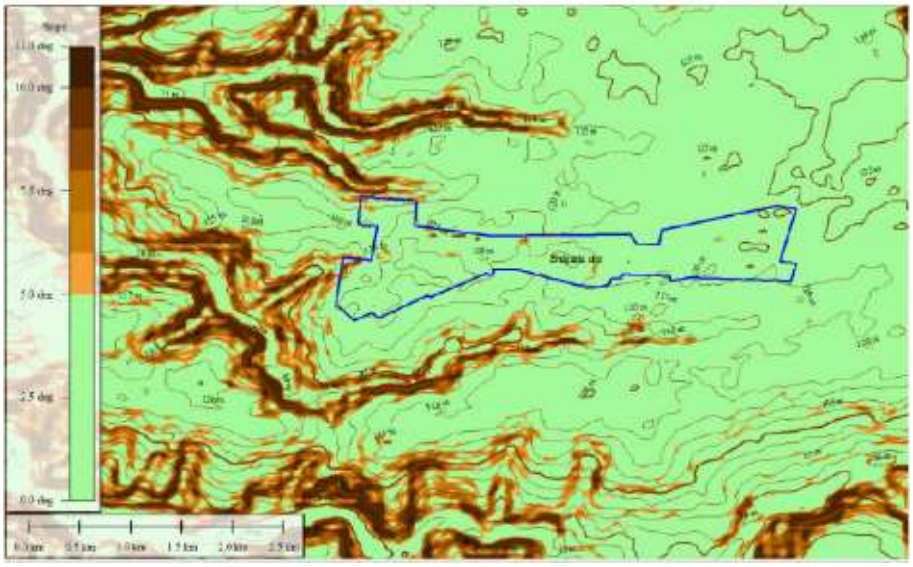


Figure 56: Site topography (slope shader) (DNV 2023[42])

The residential properties of P.Lambrinovo are adjacent to the SW corner of the site.

[40] Modified habitats are areas that may contain a large proportion of plant and/or animal species of non-native origin, and/or where human activity has substantially modified an area's primary ecological functions and species composition.

[41] Further explanation is provided in the biodiversity impact assessment.

[42] Technical Due Diligence of Solar Power Plant in Bulgaria, Jan 2023, DNV.

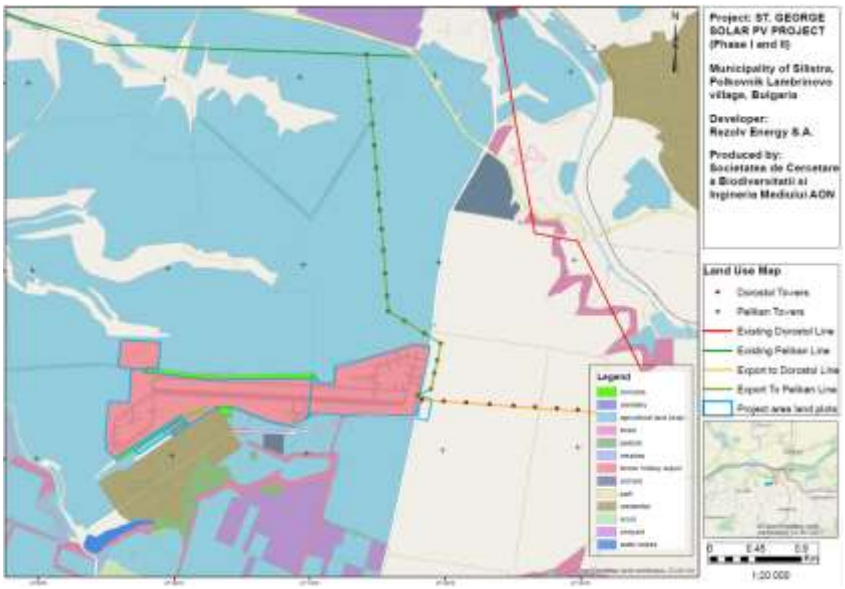
Figure 57: P. Lambrinovo property adjacent to the site boundary (marked by the treeline)

6.7. LAND USE

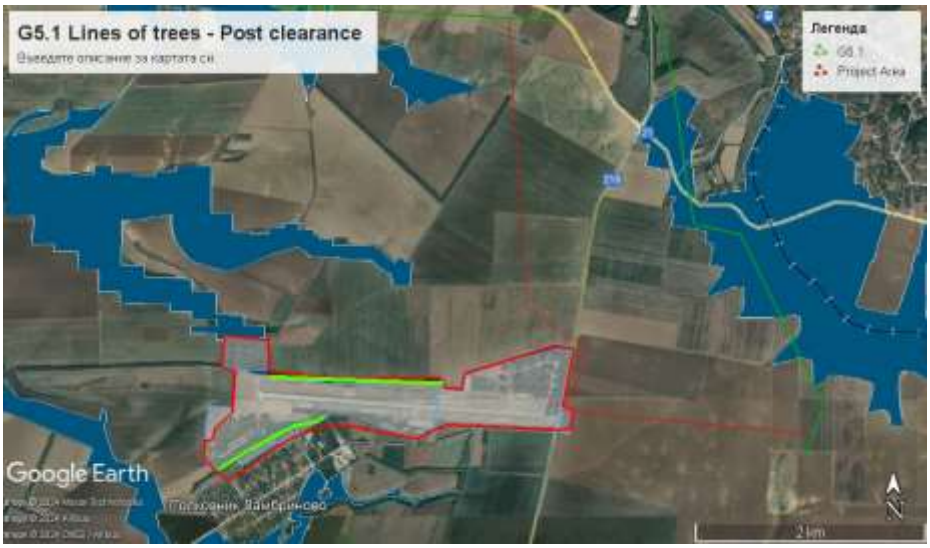
6.7.1. Current site and surrounding land use

Current land uses prevalent in the direct AOI are illustrated in Figure 58. This includes the airfield and agricultural and other habitats around the periphery of the Project site.

Figure 58: Land use in direct AOI



After clearing the vegetation, 2 strips of trees are available within the boundaries of the territory - northern and southern. They are mainly occupied by acacia, which is mixed with wild plums, walnuts, gledicia.



Orchards are present within the boundary of the project area. There are orchards only in the southern direction of the territory between the airport ramp and the western part of the territory. They are marked on the map and are within the site boundary which historically has been a secure area and therefore these orchards only serve the landowner and are not common orchards available to the wider community. The orchard has not been removed and it is basically separated by a fence. Based on feedback from FGD's, community members do not use the land (now or in the past) for anything other than agricultural activity (OHLT). Some community members do use the site for walking.


Orchards in Post clearance
Легенда
Orchards
Project Area
Google Earth
2 km
N

St. George PV Power Plant, Municipality if Silistra, Polkovnik Lambrinovo village, Bulgaria

All the trees were first cut with chainsaws, piled up and hauled away to be sold for firewood. The trees were mostly acacia - 95%, plum, cherry and walnut. Smaller trees below 8 cm in diameter were directly uprooted with a special machine and made into mulch, which remained in the fields of the fields designated as fields in the report.

There were several existing buildings (24 buildings) on the Project Plots at the beginning of the design project. Existing buildings were removed in February 2023 before the Project Company acquired the Project. The airport tower in Figure 61 is not currently understood to be earmarked for demolition and will not be part of the PV Project. Two abandoned buildings at the entrance to the site were demolished in May 2023(Figure 62). Demolition included removing building foundations, and all debris from the demolition was removed from the site. Soil mounds around parking lots for planes were cut, and soil was spread within the site and used to backfill lower areas. Pictures illustrating the works to clear the site are provided below

Figure 59: Concrete service building - east end of the airport (L) before, (R) after

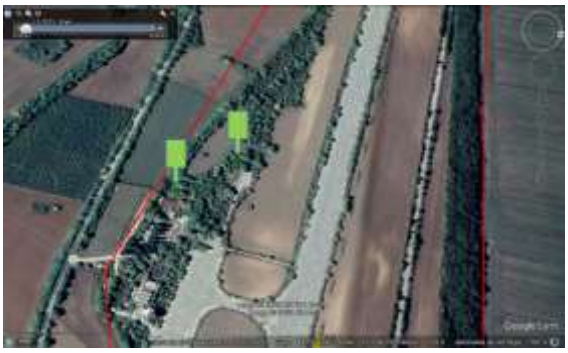


Figure 60: Group of concrete buildings next to the airport tower - southern part of the airport(L) before, (R) after

Figure 61: Clusters of concrete service buildings in the western airport (L) before, (R) after

Figure 62: Airport building (L) before, (R) after

Figure 63: Airport tower location

Figure 64:Two abandoned buildings at the entrance to the airport from the east.

Figure 65: St. George site during the earth works

Figure 66: St. George site during the earthworks

Considering the age of the development and the previous activity as an airfield, the following historical / legacy environmental and social issues can be considered relevant to the Project:

- Land is no longer suitable for agricultural use
- Environmental contamination (e.g. oil, fuel spills)
- Loss of economic activity following closure
- Obsolete buildings with unknown risk of asbestos

- Potential for derelict buildings to become roosting locations for bats

For the OHTL current land use is agricultural (as described in section 6.4.1 above). Current on-site potential sources of contaminants of concern for the main site area are limited to chemicals associated with the agricultural land use, including the potential for herbicides, pesticides and fertilisers. Livelihood impacts (historical or indirect) are addressed in the LRP.

6.7.1. Historical site and surrounding land use

The proposed PV site is historically an old airfield and before that was agricultural land or natura habitat (grassland/forested land).

For the OHLT the route has been undeveloped wit the only activity prevalent along the route being agricultural activity, except for the planned road crossing which will span the existing road in its entirety and not require any work related to the road itself.

6.8. GEOLOGY, SOILS AND HYDROLOGY

6.8.1. Geology

In the region of the Site, the Quaternary sediments have a significant area distribution. They lie on a Neogene base of grey sandy clays of the Sarpovska Formation **sN_1^p** and white to yellowish medium-grained sands of the Aydemir Formation **aN_2^d.**

Neogene

sN_1^p Sarpovska Formation (grey sandy clays)

It is represented by grey, grey bluish to light brown coloured calcareous, thin layered, in separate intervals, sandy clays. They are soft and greasy to the touch, enriched in muscovite flakes, and individual interlayers are enriched in fauna.

As thin strips, the formation is exposed above the Lower Cretaceous limestones of the Ruse formation in the scarp of the Alfatar-Silistra railway line north of the village of Kalipetrovo. Its thickness does not exceed 1.60 m and the characteristic Upper Pontian molluscs are found in it.

aN_2^d Aydemir Formation (yellowish medium-grained sands)

The Aydemir formation consists of fine to medium-grained, less often coarse-grained, gray, yellowish to light brown colored quartz sands. Toward the base, they are more clayey, and in the upper parts of the profile among them can be observed separate interlayers and lenses of strong jointed fine-grained sandstone. In places, the sands have oblique stratification, and in some intervals, they are rich in detritus. Concretions of tightly jointed sandstone of various shapes and sizes could be found often as well. The thickness of the formation usually ranges from 2 to 16 m.

Quaternary

$_{e}Q_{p}^{2-3}$ Eolian formations

They are widely distributed both on the territory of the airport near the village of P. . Lambrinovo and throughout the entire Danube plain.

The loess is a beige-yellow, light, porous, fine-grained, weakly jointed clay-siltstone rock. It is enriched with calcium carbonate, which is observed in the form of single grains, glued crusts or concretions of different shapes and sizes - a.k.a "loess towers". It's clearly expressed cleavage in the vertical direction contributes to the formation of vertical walls, especially characteristic of the Danube coast.

From north to south, there is a gradual increase in the clay content in the loess at the expense of siltstone and sandy component. Based on this, they are defined two types of loess - sandy and typical. The transition between them is unclear and gradual. The sandy loess is developed along the Danube river, and the typical loess south of it and the river.

In the middle of the loess there are buried soils representing humus-enriched, dark-brown and clayey weathering horizons. In the north, five buried soils were found, as in the specific case, and in the south, they decreased to three or four (Filipov, Mikova, 1986).

The thickness of the loess is 20-40 m, but it reaches 50 m northeast of the town of Silistra (Filipov, Mikova, 1986).

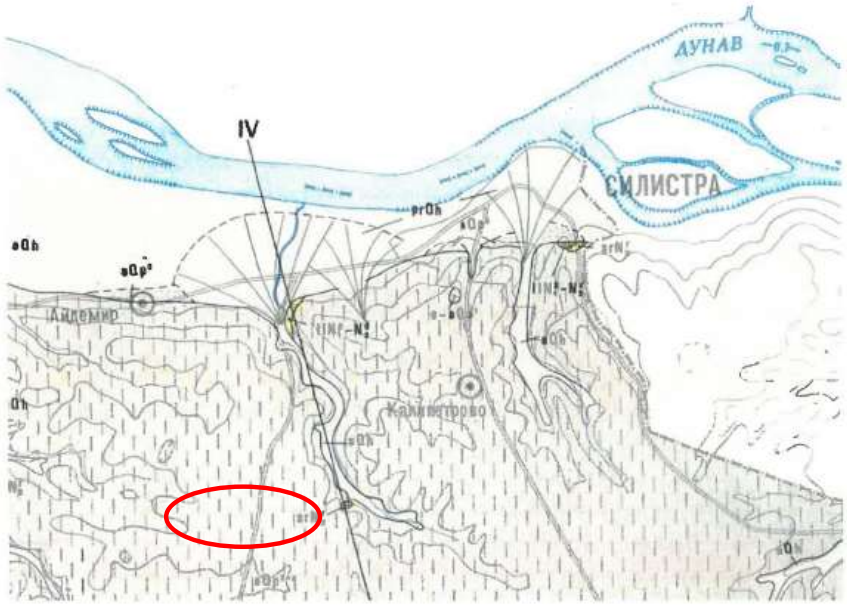


Figure 67: Geological map of the area (red area depicts approximate location of the Project site)

6.8.2. Seismicity

The considered territory belongs entirely to the Mysian platform and is characterized by a very low tectonic style. The available seismic data and the boreholes carried out immediately to the south give a relatively clear idea of the deep construction of this part of the country. Part of the Tutrakan depression and the southern slope of the Dobrudja massif are included in the Silistra map sheet. The Triassic structural stage is characterized by a platform mode of development. Then a number of main fault faults appear, which limit blocks different in size and denivelation. To the north is traced the Silistra-Belginski fault, which separates the Tutrakan depression from the southern slope of the Dobrudzha massif.

6.8.3. Soils

GeoStudio Bulgaria Ltd[43] has procured a geotechnical study to determine the soil conditions on the site. According to the geological lithological varieties established during the field studies (boreholes, pits, data from dynamic penetrations, Annexes No. 3, 4, 6, they could be separated four layers:

• Layer 1 (1-SS) - Topsoil (brown clay) - maximum established interval 0.00 - 2.10, maximum thickness - 2.10 m;
• Layer 2 (2-L 1) - First loess layer - maximum established interval 0.1 O - 6.30, maximum thickness - 6.20 m;
• Layer 3 (3-FS) - First fossil soil (brown sandy clay) - maximum established interval 2.90 - 7.50, maximum thickness -4.60 m;
• Layer 4 (4-L2) - Second loess layer - maximum established interval 5.50 - 1 O.O, maximum established thickness - 4.50 m; The entire thickness of the layer has not been passed

The studied area has a continuous cover of this type of soil. The loess is located entirely in Northern Bulgaria (the Mysian plate) and occupies the lowest part of the plain. It changes its composition and properties both horizontally and vertically. From the Danube River south to Stara Pianina, several loess varieties are distinguished: loess sand, sandy loess, typical loess, clay loess and loess clay. Loess and loess-like soils are macroporous. ln a dry state (water content, below 5% - 10%), loess soils are characterized by high strength indicators, but when wet and loaded, they subside sharply making them prone to subsidence in particular when exposed to wet conditions which are exacerbated when vegetation cover is removed.

As part of the pre-cpnstuciton survey work a Phase 1 environmental assessment (contamination) will be performed to confirm the absence of historical soil pollution. Geotechnical studies will be undertaken to confirm the soil chemistry.

[43] Geotechnical Report for St. George PV Power Plant (BG), Municipality of Silistra, Bulgaria, May 2023

6.8.4. Hydrogeology

[44]According to the hydrogeological division of Bulgaria (Antonov and Danchev, 1981), the territory of Bulgaria is divided into three hydrogeological regions: Moesian, Balkanide and Rila-Rhodope. The boundaries of the hydrogeological regions are shown in Figure 68.

Figure 68: Hydrogeological regions in Bulgaria

The studied area is part of the Moesian region and is characterized by the following hydrogeological specific features.

The Moesian hydrogeological region coincides in area with the geomorphological region of the Danube hilly plain and the tectonic region of the Moesian plate. The North-Fore-Balkan fault serves as the southern boundary of the region. Three first order morphotectonic structures (regions) have formed as a result of continuous epirogenic movements: Lom-Pleven depression - on the west; North-Bulgarian uplift - in the middle; Varna depression - on the east.

The region is generally characterized by the following features:

- The level position of the aquifers and complexes in the Mesozoic-Cainozoic cover, the largest number of aquifers being in the two depressions.

- Vertical hydrodynamic zoning of the groundwater. Three zones can be identified:

(i) Upper zone with an active water exchange and fresh unconfined and confined waters from the infiltration genetic cycle.

(ii) Middle zone with slow water exchange, higher mineralization and water temperature. The waters are confined and of mixed genesis - old marine and infiltration waters.

[44] A Digital Groundwater Map Of Bulgaria In 1:500 000 Scale – Objectives And Methodological Approach, by Pavel Pentchev, Chavdar Gyurov, Nikolay Stoyanov, Vassil Petrov University Of Mining And Geology "St. Ivan Rilski" Sofia, Bulgaria –
https://www.researchgate.net/publication/272178488_A_Digital_Groundwater_Map_Of_Bulgaria_In_1500_000_Scale_-_Objectives_And_Methodological_Approach

(iii) Lower zone - there is practically no water exchange, the waters are highly mineralised (from 50 to over 200 g/l) and the water temperature is high. By origin the waters are mainly from the sedimentogenic cycle (Sinian and epigenetic), which have undergone considerable metamorphosis under conditions of stagnant water regime and great depth. The Triassic and basement waters fall into this zone.

- There is a hydraulic connection between the aquifers and complexes at certain points along the tectonic fault lines, which are otherwise well isolated from each other (with the exception of the sections with hydrogeological windows).

- Considerable area distribution of the Pre-Quaternary aquifers, some of them (the Malm-Valanginian and, with a few exceptions, the Middle Triassic one) having pervasive occurrence.

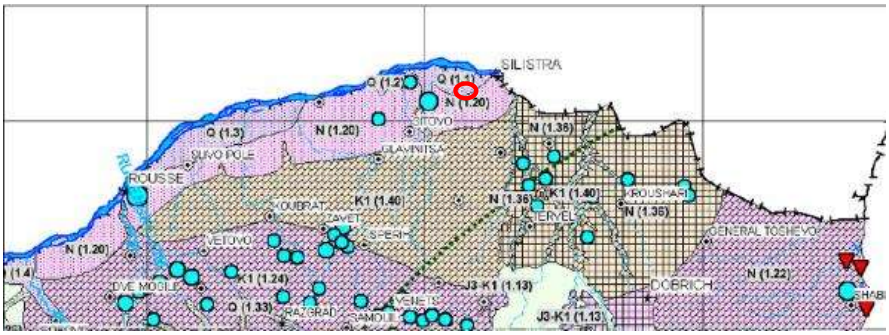


Figure 69: North-East Part Of Moesian Hydrogeological Region Of Bulgaria – extract (red circle denotes project location)

The Project Site is located in the area of MAJOR AQUIFER – Hydrogeological formation with middle permeability and / or productivity (Class B). During the conducted studies to date the groundwater level was established only in exploratory borehole S1 at a depth of 9.3 m. To determine the water permeability coefficient of the filtration environment there were taken 10 samples, which results are given in Annex 14 of the Geotechnical study. Ground water is expected at under 30 m at the PV Site.

6.9. WATER RESOURCES

There are no permanent or temporary surface water features (including wells or boreholes) within the Project site. The closest surface water bodies are located in the south-west of P. Lambrinovo at approx. 600 m distance. A small surface water body is at a distance of around 2.5 km to the north-west and bigger surface water body (freshwater lake) is at a distance of approx.7 km from the Project inside a protected natural area - Srebarna. Srebarna Nature Reserve is a freshwater lake adjacent to the Danube and extending over 600 ha. The locations of these features are illustrated in Figure 70.

Figure 70. Surface water features in the wider project area

6.10. SOLID WASTE MANAGEMENT SERVICES

6.10.1. Municipal solid waste / construction waste (non-hazardous)

There are no waste management facilities at the Project site. For the purpose of Project waste disposal, regional general waste (non-hazardous) facilities are available. The nearest licensed landfill to the Project site is located 11 km by air and 16 km by the national road network.

Figure 71: Nearest landfill to the Project site

Since September 2006, the town of Silistra has been operating a regional landfill for municipal solid waste (RDTB), built with funds under the ISPA Program of the European Union. The landfill accepts household, construction and industrial waste. It serves the municipalities of Silistra, Kaynardzha, Sitovo, Dulovo, Alfatar and Glavinitsa.

All settlements in the municipality of Silistra are covered by an organized garbage collection system. At the moment, the main method of disposal of waste is its disposal at the RDTB in the city of Silistra. Solid waste disposal is carried out according to a schedule approved and controlled by the municipality. The frequency of service for the city of Silistra varies from daily for the "Beaver" containers to once a week for the "Meva" containers and the 4 mZ containers in the villages of Aydemir and Kalipetrovo

The municipality of Silistra has a contract for "Construction of an installation for preliminary treatment of MSW, including composting of green waste", but it has not yet been implemented. Construction waste is mainly treated by landfilling.

In the town of Silistra, there is an installation for separating waste from packaging, but the problem with the management of specific waste flows has not yet been fully resolved - there is no system for the separate collection of hazardous household waste, there is no system for managing the waste from out-of-use electrical and electronic equipment (IUEEU), tires, oils and petroleum

products, etc. specific and mass-distributed waste. At the landfill in Silistra, construction waste is deposited mixed with household waste.

The conditions and regulations under which the waste management activities will be carried out are listed in the "Regulation on the conditions and procedures for disposal, collection, including separation, transportation,

The overloading, utilization and disposal of household and construction waste, including bio-waste, hazardous household waste, massive, scattered waste, and maintaining and protecting the cleanliness of the territory of the municipality of Silistra", which is from 2017 and is the result of the changes in the national legislation.

Regarding the old village landfills, projects have been drawn up for their reclamation, but not all of them have been implemented yet. A problem for the municipality remains the unclosed, unregulated landfills in a total of 18 settlements: Aydemir village, Kalipetrovo, village Babuk, the village of Kazimir, the village of Prof. Ishirkovo, the village of Bradavari, the village of Yordanovo, the village of Sarpovo, the village of Polk. Lambrinovo, the village of Sratsimir, the village of Bulgarka, the village of Bogorovo, the village of Pop Kralevo, the village of Glavan, the village of Vetren, the village of Srebarna and the village of Major Cenovich. The Project documentation will ensure that these landfills are not used by the Project, in particular given the availability of other options that are regulated in line with GIIP.

6.10.2. Hazardous waste facilities

The nearest hazardous waste disposal options are in the following locations:

- Alfa Clean EOOD hazardous waste depot is located in the village of Kalipetrovo, 2 "Path II" street. Alfa Clean EOOD offers disposal, collection and transportation of hazardous waste in Sofia and Varna. It works for the whole of Bulgaria.
- “Regional Association for Waste Management for the Lovech Region", which includes the municipalities of Lovech, Ugarchin and Letnitsa.
- "GREENBURN" EOOD, Razgrad 7200, "April Uprising" Blvd. No. 68; 0885299124; 084/66 15 15; office@ grennburn.bg

The operations at these locations are considered to align with GIIP and EU requirements (as set out in Bulgarian national law).

6.10.3. PV panel recycling facilities

According to the European Union, 90% of the solar panels in the region can be fully recycled. The European Union laws also state that the recycling of solar panels is necessary and mandatory. The union has set up a target of 85% recovery rate, and the overall preparation for recycling and reuse target has been around 80%. Options for PV panel recycling exist in Bulgaria. The European WEE Directive has been in force in Bulgaria since 01 January 2024.

Options include such platforms as “European Recycling Platform” which is responsible for the management of the discarded/damaged PV panels, sending them for recycling units that separate

the aluminium frame, metal conductors, plastics and the glass and photovoltaic elements. The first ones are completely recycled. The destination of the major part of plastics and the glass and photovoltaic elements is a controlled specific landfill indicated by European Recycling Centre (ERC).

6.11. ARCHAEOLOGY AND CULTURAL HERITAGE

[45]Between 1950 and 2000, Silistra changed its look - the city is modernizing and industrializing. It has become the centre of the food industry, textiles, electronics. At the same time, it is the centre of a large agricultural area. Despite the modernization, the city and the region have preserved and exhibited remarkable monuments of cultural and historical heritage. There are many ruins of the Roman and Medieval fortresses, churches, residences and buildings from the 2nd to the 15th century including one of Europe's most valuable ancient tombs with unique frescoes from the 4th century. Today the traces of the ancient past are exhibited and form the National Architectural & Archaeological Reserve "Durostorum - Drucker - Silistra".

There are no recreational facilities or cultural features of national or international importance on the Project site. Currently no above ground historical and cultural heritage was observed within the direct impact area of the Project site or OHTL route during site walkovers. The above ground environment is highly modified from historical activities (agriculture and airport). Liaison with local archaeological representatives indicates there are no specific sites of local or national cultural importance within the direct impact area (refer to SEP, Volume III). Verification with the local community and l for the potential for below ground archaeological features and other local sites of cultural importance in the vicinity of the site is ongoing.

UNESCO World Heritage List

The closest UNESCO site to the Project is:

- Srebarna Nature Reserve (1983) (situated of approx. 5,9 km[46] in the north-west of the project)

The UNESCO site is assigned based on its ecological heritage (biosphere reserve) and has been described in section 6.2.

Properties of Bulgaria inscribed on the World Heritage List[47], which are located in the wider AOI or in the vicinity of the transportation route are:

- Cultural
  - Ancient City of Nessebar (1983) (~250km)
  - Madara Rider (1979)(~125km)
  - Rock-Hewn Churches of Ivanovo (1979) (~150km)
  - Thracian Tomb of Sveshtari (1985) (~70km)

[45] https://www.britannica.com/place/Silistra

[46] According to map available at https://worldheritageoutlook.iucn.org/explore-sites/wdpaid/9612

[47] https://whc.unesco.org/en/statesparties/bg/

6.12. CLIMATE AND CLIMATE PROJECTIONS

According to the classification scheme of Sabev and Stanev "Climatic regions of Bulgaria and their climate" - 1963, the municipality of Silistra is characterized by a moderate continental character and falls into the Danube climatic sub-region. Characteristic of this region is the hot summer, the early onset of spring and the strong cold in the winter.

6.12.1. Temperature

The absolute minimum temperature reached -32 degrees, and the maximum temperature reached 40.4 degrees in 1927. Average annual air temperature is 11.6 degrees. Steady retention of air temperature above 10 degrees begins during the first ten days of April and lasts until the end of October - about 200 days.

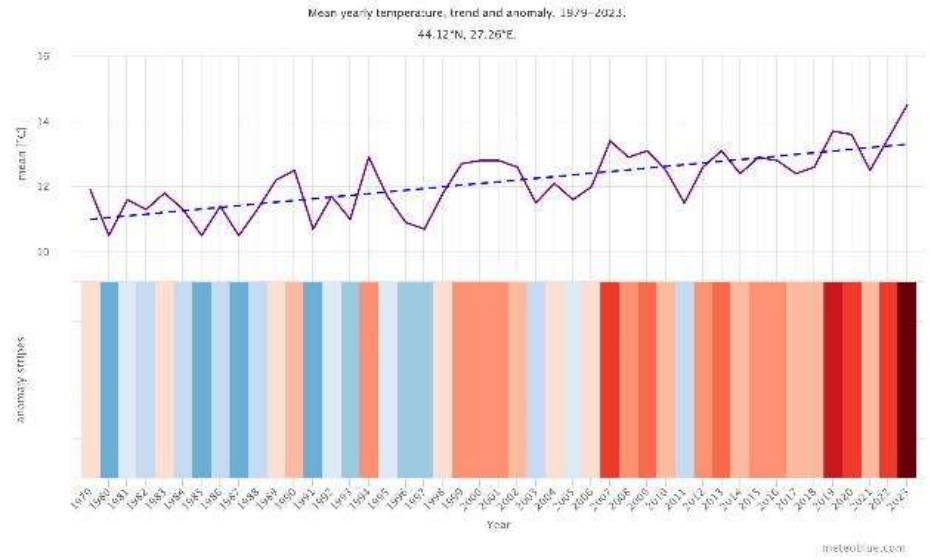


Figure 72: Yearly Temperature Change Silistra
(source: https://www.meteoblue.com/en/climate-change/silistra_bulgaria_727221)

The top graph shows an estimate of the mean annual temperature for the larger region of Silistra. The dashed blue line is the linear climate change trend. If the trend line is going up from left to right, the temperature trend is positive, and it is getting warmer in Silistra due to climate change. If it is horizontal, no clear trend is seen, and if it is going down, conditions in Silistra are becoming colder over time.

In the lower part the graph shows the so-called warming stripes. Each coloured stripe represents the average temperature for a year - blue for colder and red for warmer years.

6.12.2. Precipitations

Precipitation in the area is unevenly distributed and insufficient, with the largest amounts falling in the spring and early summer months, and the least in winter. The annual amount is 547 mm/sq.m., which is below the average for the country. The snow cover lasts 50-60 days with a thickness of 16-30 cm.

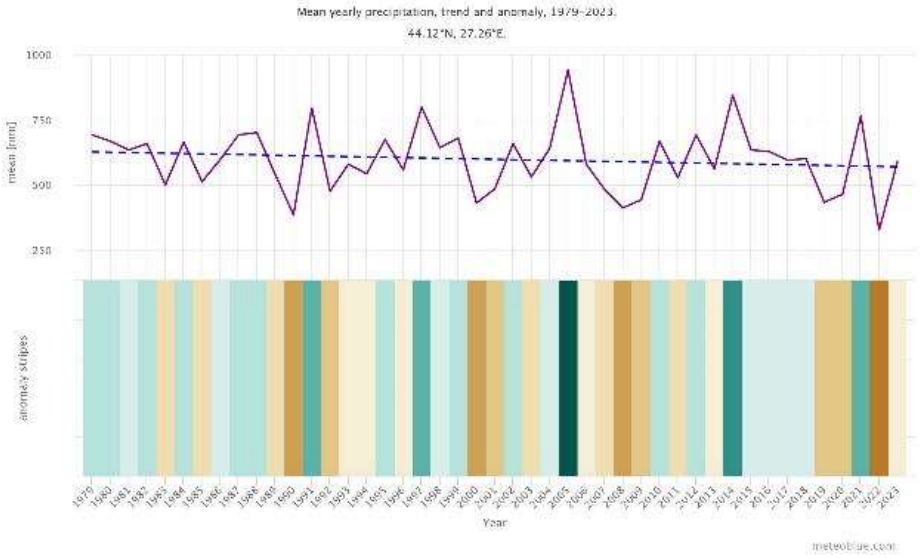


Figure 73: Yearly Precipitation Change – Silistra
(source: https://www.meteoblue.com/en/climate-change/silistra_bulgaria_727221)

The top graph shows an estimate of mean total precipitation for the larger region of Silistra. The dashed blue line is the linear climate change trend. If the trend line is going up from left to right, the precipitation trend is positive, and it is getting wetter in Silistra due to climate change. If it is horizontal, no clear trend is seen and if it is going down conditions are becoming drier in Silistra over time.

In the lower part the graph shows the so-called precipitation stripes. Each coloured stripe represents the total precipitation of a year - green for wetter and brown for drier years.

6.12.3. Weather

Data for the average annual wind speed and frequency according to the direction of the data from the meteorological station gr. Silistra, Climatic reference book of the People's Republic of Bulgaria, volume IV, and provided in the table below.

Table 26: Average annual wind speed and frequency by direction

Direction	N	NE	E	SE	S	SW	W	NW
average speed	4.5	4	3.2	3.5	3.6	3.9	3.4	2.9
Frequency	11.7	17.4	11.3	11.2	9.8	17.2	12	9.4
% Quiet time	29%							

Source: Climatic reference book of the National People's Republic of Bulgaria, volume 4.

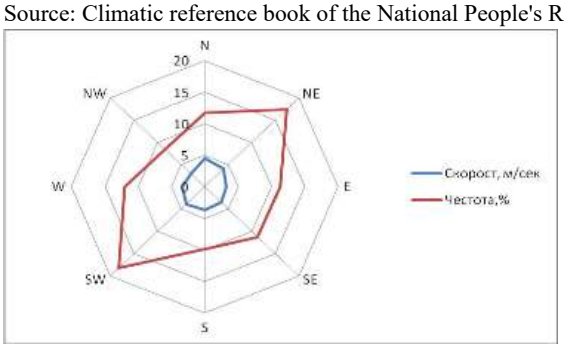


Figure 74: Average annual wind rose by frequency, in %, by directions, according to data from MS "Silistra"

6.12.4. Climate projections

Climate change has increased the average global temperature and is leading to more frequent high temperature extremes such as heat waves. Higher temperatures can cause increased mortality, reduced productivity and damage to infrastructure. Extreme temperatures are expected to be a key impact in Central and Eastern Europe. Together with reduced summer rainfall, this may increase the risk of drought and is expected to increase energy demand during the summer. It is estimated that the intensity and frequency of river floods during winter and spring (in various regions) will increase due to higher winter precipitation. Climate change is also predicted to lead to greater variability in crop yields and more frequent forest fires. Projected trends show that temperatures in Bulgaria will continue to increase. Under a high-emission scenario, the regional climate model used in this profile estimates that monthly temperatures are expected to increase by 2.2°C in the 2050s.[48]

[48] 15848-WB_Bulgaria Country Profile-WEB.pd - https://climateknowledgeportal.worldbank.org/sites/default/files/2021-06/15848-WB_Bulgaria%20Country%20Profile-WEB.pdf

Despite significant annual variability, under a high-emission scenario, monthly precipitation is expected to decrease steadily and is projected to decrease compared to the baseline period (1986–2005) by 4.4 mm by the 2050s[49].

Currently, Bulgaria in general is classified as having high risk of river flooding, urban flooding, and wildfires. It has a medium risk of experiencing earthquakes, water scarcity, and extreme heat, and low to very low risk of landslides, coastal flooding, and storms.

The Project's location in central Europe is considered to be moderately susceptible to physical climate change risks, including (among other things) extremes of temperature, precipitation, and high winds, which may have adverse consequences on the Project in the long term. However, any weather changes (wind, temperature, rain) up to 2050 are expected to be within the design parameters of the PV Project, substation, drainage system, and the OHTL. At the site the most prevalent site-specific risks are like to be urban flooding, earthquakes, water scarcity and periods of extreme heat. The extent of the projected change in the short term (during the construction phase), where most impacts on workers may be realised, is not considered significant or assessed further except to make provisions for extreme weather events in the scope of the emergency preparedness plan and the H&S plan.

6.13. AIR QUALITY

6.13.1. Baseline conditions

The Project site is far from major urban areas and significant industrial pollution sources.

The nearest commercial property to the Project is adjacent to the site and is a warehouse facility. The nearest industrial activities to the Project site are mainly warehousing and light industrial activity to the west of Silistra at the Northern Industrial Zone, in excess of 6 km to the north of the site. The Project site area is relatively flat, with elevations ranging from approximately 110m above sea level (asl) in the south-western areas of the site, to 124m asl in the north-eastern area of the site.

6.13.2. Local air quality

As a member state of the European Union (EU) Bulgaria is required to comply with ambient air quality standards set out in EU directives (Directive 2008/509/EC and subsequent amending directives). Under national and European legislation (Directive 96/62/EC) Bulgaria is divided into six air quality assessment and management areas (ROUKAVs). Air quality data is compiled, and analyses made for each area taking into account the specific nature of local communities[50].

The assessment of air quality in the territories of the country is carried out by a national monitoring system through which the concentrations of key indicators is monitored. The Republic of Bulgaria

[49] 15848-WB_Bulgaria Country Profile-WEB.pd - https://climateknowledgeportal.worldbank.org/sites/default/files/2021-06/15848-WB_Bulgaria%20Country%20Profile-WEB.pdf

[50] https://eea.government.bg/cms/en/soer-2010-part-c/commonality-air-pollution/commonalityreport-ap-2

does not have chronic problems with major gaseous air pollutants, however, excess levels of fine particulate matter (PM_{10} and $PM_{2.5}$), are experienced, mainly due to the use of domestic solid fuels (coal, wood) for heating and the old automobile stock. National monitoring system data shows a reduction in the past years in the number of both exceedances of daily average and annual average concentrations of fine particles for almost all monitoring points.

The municipality of Silistra is included in the list of regions for the assessment and management of atmospheric air quality (ROUKAV) in connection with exceeding the established standards for pollutants PM_{10} and $PM_{2.5}$.

According to data from annual reports on the state of the environment in the territory controlled by RISW-Ruse and reports on the quality of atmospheric air and its impact on the health of the population of the Silistra region, prepared by RZI-Silistra, as a result of the implementation of measures in the territory of the municipality, a permanent improvement in the quality of atmospheric air has been observed.

In the city of Silistra, there is one monitoring point where a differential optical absorption spectroscopy (DOAS) system is located to monitor the quality of atmospheric air according to indicators in the Law on the Cleanliness of Atmospheric Air, published State Gazette no. 45/1996. The air quality monitoring point is located in the building of the Trade Unions, in the central part of Silistra. Data for emissions of sulphur dioxide, nitrogen dioxide and fine dust particles in the atmospheric air in the city of Silistra were provided by the Executive Agency for the Environment, evaluated through the National Environmental Monitoring System.

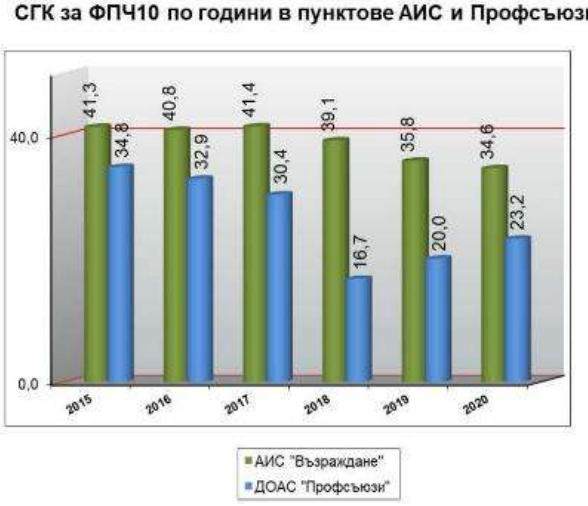
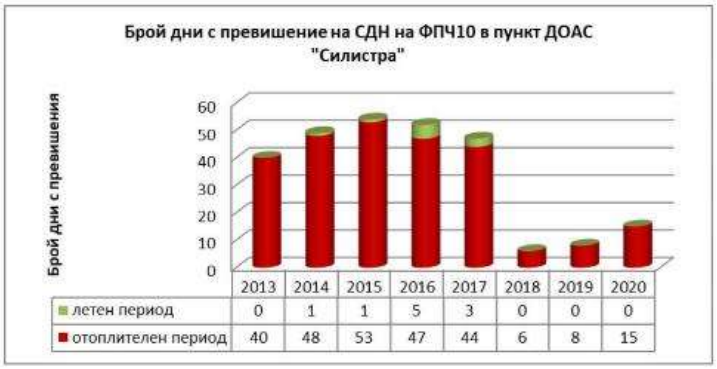


Figure 75: Average annual concentration for FP10 (PM10)

The average annual concentration for PM_{10} in 2018 was 16.7µg/m^3, which is significantly lower than the average annual concentrations measured in 2017 (30.4µg/m^3), 2016 (33.9µg/m^3) and 2015 (34.7µg/m^3). In 2019 and 2020, 20.0µg/m^3 and 23.2µg/m^3 were reported, respectively, which indicates an increase in annual average concentrations but remains well below the 40µg/m^3 nationally adopted EU standard.



	2013	2014	2015	2016	2017	2018	2019	2020
летен период	0	1	1	5	3	0	0	0
отоплителен период	40	48	53	47	44	6	8	15

Figure 76. PM10 concentrations in the project area (Silistra)

From the data on the quality of atmospheric air for the municipality of Silistra, it is clear that the number of exceedances of the MPC for PM_{10} is 15 for 2020, and the limit of 35 times the annual exceedance of the MPC for this indicator has been observed. For comparison, in 2017 there were 47 exceedances for PM_{10}, in 2016 there were 52 exceedances and in 2015 there were 54 exceedances. After 2017, when the city switched to natural gas, a sharp decrease in the number of annual exceedances of the indicator was observed. The primary source of the measured excess levels of PM_{10} in the city of Silistra during the period reported above, was the household sector (solid fuel burning); transport and industry had a secondary role

For the monitored pollutants sulphur dioxide and nitrogen dioxide monitored by the DOAS system, no exceedances were registered for the period under review.

The Project area lies approximately 8km south-west of Silistra and is predominantly agricultural and therefore expected to have similar or better levels of air quality compared to Silistra. No anthropogenic point sources of air pollutants (e.g., heavy industry, thermal power plants) are located within 500m of the Project site. Emissions arising from vehicle exhausts on the adjacent 218 road to the east of the site, and the minor roads in P. Lambrinovo to the south were identified as potential sources of air pollutants, albeit relatively minor. No specific air quality monitoring has been performed at the site. .

6.14. UTILITIES and OTHER INFRASTRUCTURE

6.14.1. Aviation

The nearest international airport to the Project Site is in the city of Varna (approximately 70 km distant). The nearest aerodrome (small scale) is the Rebus Flight school (Silistra) approximately 3 km (near Voynovo).

6.14.2. Municipal water supply[51]

Bulgarian water utility company ViK Silistra serves the Silistra municipality. Coverage of the water-supply system in Bulgaria is very high, and drinking water quality typically meets standards. More than 5,000 towns and villages have central water-supply systems. This represents 99 percent of the overall population. Drinking water quality meets standards more than 95 percent of the time in all large water supply zones, although problems remain with regard to compliance with standards in relation to water quality and seasonal modes of consumption, especially in the smaller water-supply zones. Connections to the wastewater network are lower, with around 66 percent of the population is connected to a wastewater collection network, and an even lower - 50 percent is connected to a wastewater treatment plant. Silistra is one of four districts not connected to a functioning WWTP. Provision for connection to district level WWTP may not be possible therefore compliance with GIIP for wastewater disposal will require transfer of wastewater out the municipality. Further information will be provided from follow up socio-economic field surveys as defined in section 6.15.

6.14.3. Electricity and gas

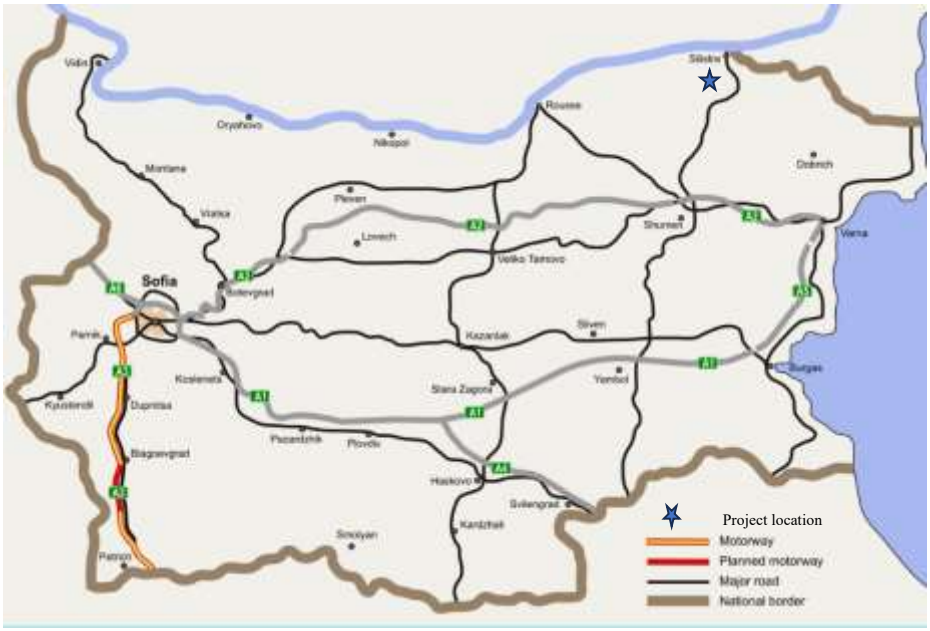
The site is connected to the grid system for provision of electricity to support the construction works. Further information will be provided from follow up socio-economic field surveys as defined in section 6.15.

6.15. TRAFFIC AND TRANSPORTATION

The site has very good tarmac road and is easily accessible, being connected to Silistra town, located approx. 12 km away, via main roads Route 218 (single lane carriageway) and Route 21 which is considered a second-class road. The Bulgarian motorway and major road network are illustrated in Figure 77.

Figure 77: Bulgarian road network

[51] https://faolex.fao.org/docs/pdf/bul200702.pdf



The components of the PV and OHTL will be transported from the one of the proposed harbours illustrated in Figure 78 and Figure 79 to the Silistra District using major roads in Bulgaria and further afield. Delivery vehicles will use major highways from the Port to the Silistra District regardless of their origin, where they will converge on R21 from the north or the south and then the R218 that leads directly to the PV Site.

Traffic volumes on the R218 and R21 are considered to be low with low volumes of heavy goods vehicles (HGVs). As part of the EPC scope of work a detailed traffic transport survey and Social Impacts Register will be prepared to confirm the most appropriate transport routes for the delivery of Project components. As part of the ESMS, the EPC will develop and implement a Traffic Management Plan (TMP), including a traffic risk assessment, which defines appropriate traffic management and accident prevention measures to mitigate any impact on local communities and general road users. The EPC will assess local road conditions and complete a dilapidation survey of structures/infrastructure adjacent to community roads (as required).

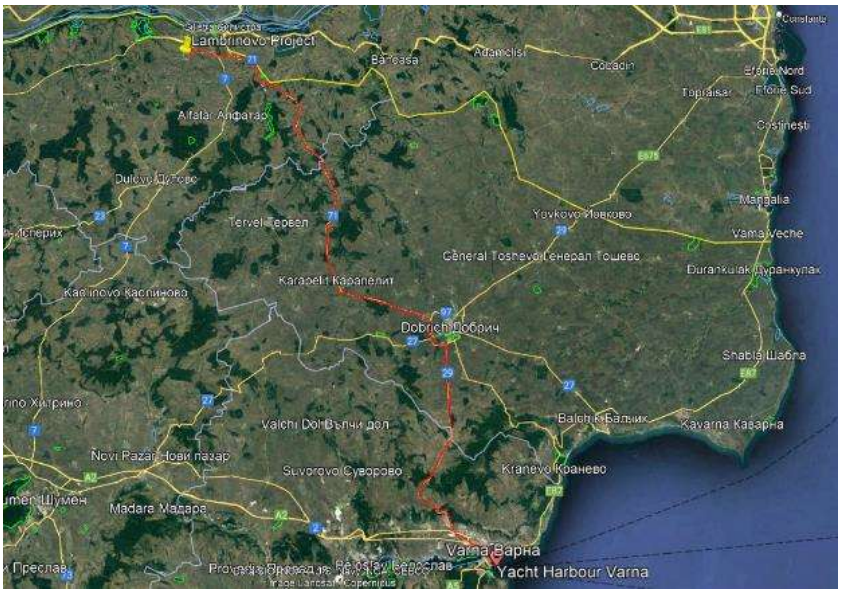


Figure 78: Example Route 1 – Varna harbour, Bulgaria to project site

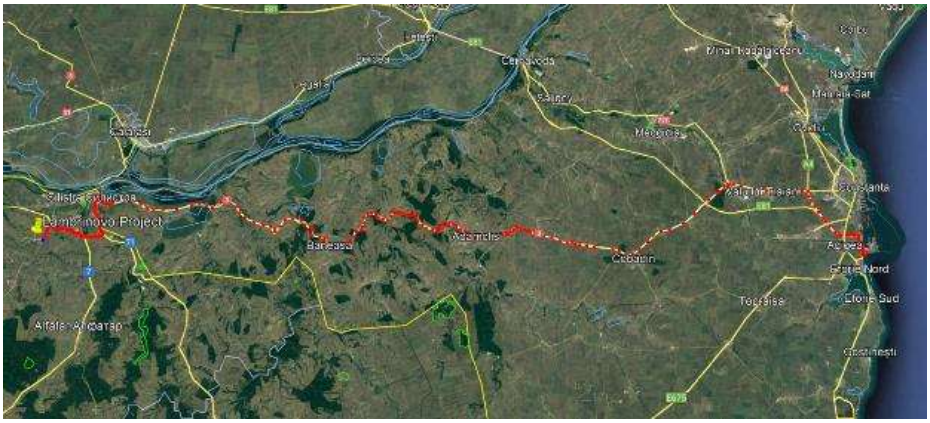


Figure 79: Example Route 2 – Constanta harbour, Romania to project site

6.16. NOISE AND VIBRATION

An essential part of any noise assessment is accurate measurement and comprehension of the existing acoustic environment in the absence of the Project, and specifically the identification of the baseline noise levels at potentially noise sensitive receptors (NSRs).

6.16.1. Area of influence

The area of influence varies according to the stage of the Project; construction and decommissioning will have significantly higher noise levels than operations of the solar power plant, nevertheless, noise from inverters during operation is possible and should be considered.

The area of influence (AoI) for noise impacts at the Project is determined by the extent of the power plant, proximity of the nearest sensitive receptors that may be affected by the construction and operation of the PV power plant and the OHL and associated infrastructure. The size of the AoI depends on several factors, including the construction, topography, prevailing weather patterns (e.g., wind speed), and the locations of sensitive receptors such as residential areas, schools, and hospitals.

During the construction phase of the PV power plant, the primary sources of noise are likely to be construction activities, associated excavations, and movement and delivery of materials.

The operational stage of solar PV power plants will have some minor noise sources (string inverters, sub-stations) with potential to impact sensitive receptors which will define the operational AoI. Other operational noise will mainly be associated with vehicle and plant movements and use associated with maintenance activities and anticipated noise levels are not expected to be significant enough to warrant a defined area of influence.

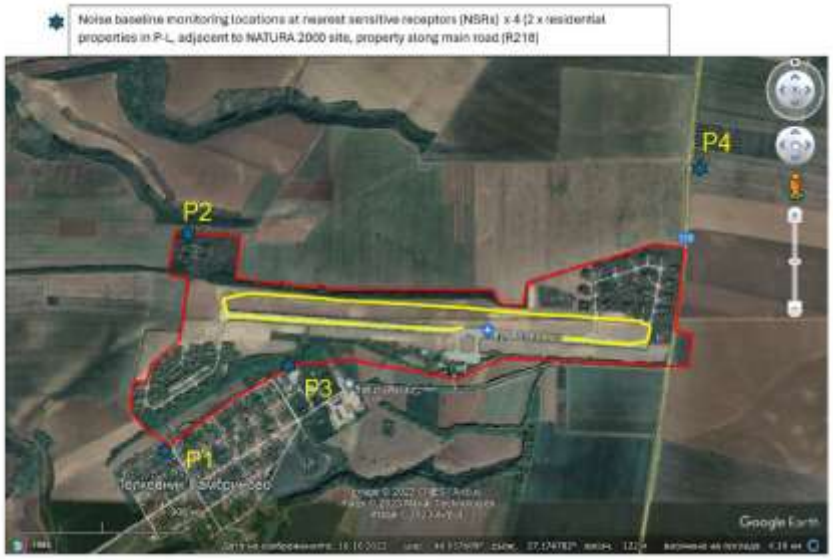
No industrial noise sources are observed within 500m of the PV Site or OHTL route. Current anthropogenic noise in the vicinity of the project area is related to agriculture (nearby wood mill, humans working, machinery and animals), human domestic activities, vehicular traffic along the rural roads and pathways. In general, for the area, ambient noise levels would be expected to be higher during the dry season, due to increased traffic movement and agriculture activities. In rural areas, there is no published data for ambient noise levels.

6.16.1. Baseline noise survey

A baseline noise survey was undertaken on 22 and 23 March 2024 by ‘Decibel’ (Volume 3 – Appendix II) . Results of the monitoring will be used to assist in evaluation of any noise related grievances and were also used to develop a 3D noise model and provide proposals for noise mitigation where needed. The report was issued on 05 June 2024 (R-Engineering EOOD. Solar Park - Silistra City. Preparation of 3D model and noise map and soundproofing proposal 05.06.2024).

Noise measurements have been made at four locations at P. Lambrinovo in order to establish a reliable baseline. The measurement durations were determined considering the consistent nature of the noise environment around the Project site. Locations for the four measurement points are indicated in Figure 80.

Figure 80: Baseline noise monitoring locations



- T1 is situated close to residential buildings in the populated area.
- T2 is located at the northern boundary of the solar park.
- T3 is positioned along the southern boundary of the park, next to the farm.
- T4 is situated outside the boundaries of the solar park, next to the main road 218 and is included as a representative baseline for any NSR's (residential properties) along route 218 from Silistra.

The measurements were performed in the morning, daytime, and nighttime and the results are provided in Table 27 below with reference to Regulation No. 6 of June 26, 2006 (Official Gazette, issue 58 of July 18, 2006) and relevant noise standards in IFC EHS guidelines. The full baseline report is provided in the Technical Appendix (Volume III).

Table 27 shows the results of the baseline monitoring.

Table 27: Presentation of baseline noise measurements.

Poss.	Measurement point	Stage of the day in which the measurement was made	Measured value of Laeq,dB(A)	Regulation No. 6 of June 26, 2006 (Official Gazette, issue 58 of July 18, 2006 (dB(A)	IFC EHS guidelines
1	P1	Morning measurement	40,1	55	**55**
		Noon measurement	45,1	50 (evening)	**55**
		Night measurement	37,0	45	**45**
2	P2	**Morning measurement**	**57,0**	**55**	**55**
		Noon measurement	47,1	50 (evening)	**55**
		Night measurement	30,9	45	**45**
3	P3	Morning measurement	54,8	55	**55**
		Noon measurement	37,5	50 (evening)	**55**
		Night measurement	34,5	45	**45**
4	P4	**Morning measurement**	**58,3**	**55**	**55**
		Noon measurement	55,3	50 (evening)	**55**
		Night measurement	**49,4**	**45**	**45**

Exceedances of the regulatory requirements at point 2 (norm day 55dB(A)) is considered to be caused by aerodynamic noise (presence of stronger wind gusts). Point 2 is not close to any sensitive receptors (eg, residential). Point 4 is located next to a road and is likely to be indicative of road noise. Point 4 is not close to any sensitive receptors (eg, residential) although would be indicative of any residential properties along this road and was added for the purpose of future noise monitoring from traffic related activity. According to the regulatory requirements for sound pressure in front of the facades of residential buildings/farms located, there is no excess of background noise under baseline conditions prior to development of the solar power plant.

6.17. SOCIO-ECONOMIC BASELINE

The socio-economic baseline has been generated based on secondary resserach, KII FGD's and socio-economic survey (Volume 3, Appendix III).

6.17.1. Social Area of Impact (AOI)

Administratively the Project is located in the Silistra Region in the village of P. Lambrinovo. Silistra Region is located in the North-eastern Bulgaria, located along the right bank of Danube river, in the Danubian Plain, bounded by Romania to the northeast and north beyond the river. It is named after its administrative centre - the city of Silistra which is also the capital of the province.

Silistra Municipality consists of the following:

- City – Silistra

- Villages: Aydemir, Babuk, Bogorovo, Bradvari, Balgarka, Glavan, Kazimir, Kalipetrovo, P. Lambrinovo, Popkralevo, Profesor Ishirkovo, Smilets, Sratsimir, Srebarna, Sarpovo, Vetren, Tsenovich, Yordanovo

Project infrastructure is sited with the districts of P. Lambrinovo, Smilets (PV Site), Aydemir and Kalipetrovo communities (OHTL). For this reason, these communities are identified as project affected communities "PACs". There are two other communities in the region that may incur secondary (indirect) positive and negative impacts (Tsenovich and Silistra).

The distance of these communities from the Project main site is as follows:

- P. Lambrinovo (adjacent to the site)
- Smilets – approx. 1,9 km
- Kalipetrovo – approx. 2,8 km
- Tsenovich – approx. 3,5 km
- Aydemir – approx. 3,6 km
- Silistra -approx 7,0 km

P. Lambrinovo, Smilets, Aydemir, Kalipetrovo are considered to be directly impacted by the PV Project ("direct AOI communities") considering that they have some project infrastructure (PV site or OHTL) within the boundary of their communities and / or are within the direct AOI as defined by various topics (e.g. noise or air quality) in the topic specific impact assessment chapters to follow. Information on project affected people is provided in chapter 15. Silistra and Tsenovich are considered to be indirectly affected communities ("Indirect AOI communities) as they do not have any direct project impacts from the PV project infrastructure, noise or transportation impacts), but they may experience some indirect impacts resulting from temporary labour influx and indirect socio-economic benefits e.g. employment opportunities, as elaborated further in topic specific impact assessment chapters to follow.

The approximate boundaries for the administrative areas of each village are depicted in Figure 81. Most of the land around the site is agricultural and other receptors include agricultural users, farm workers and road users. The residential areas are further illustrated in Figure 82.

Figure 81: Towns and villages administrative areas (approximate)

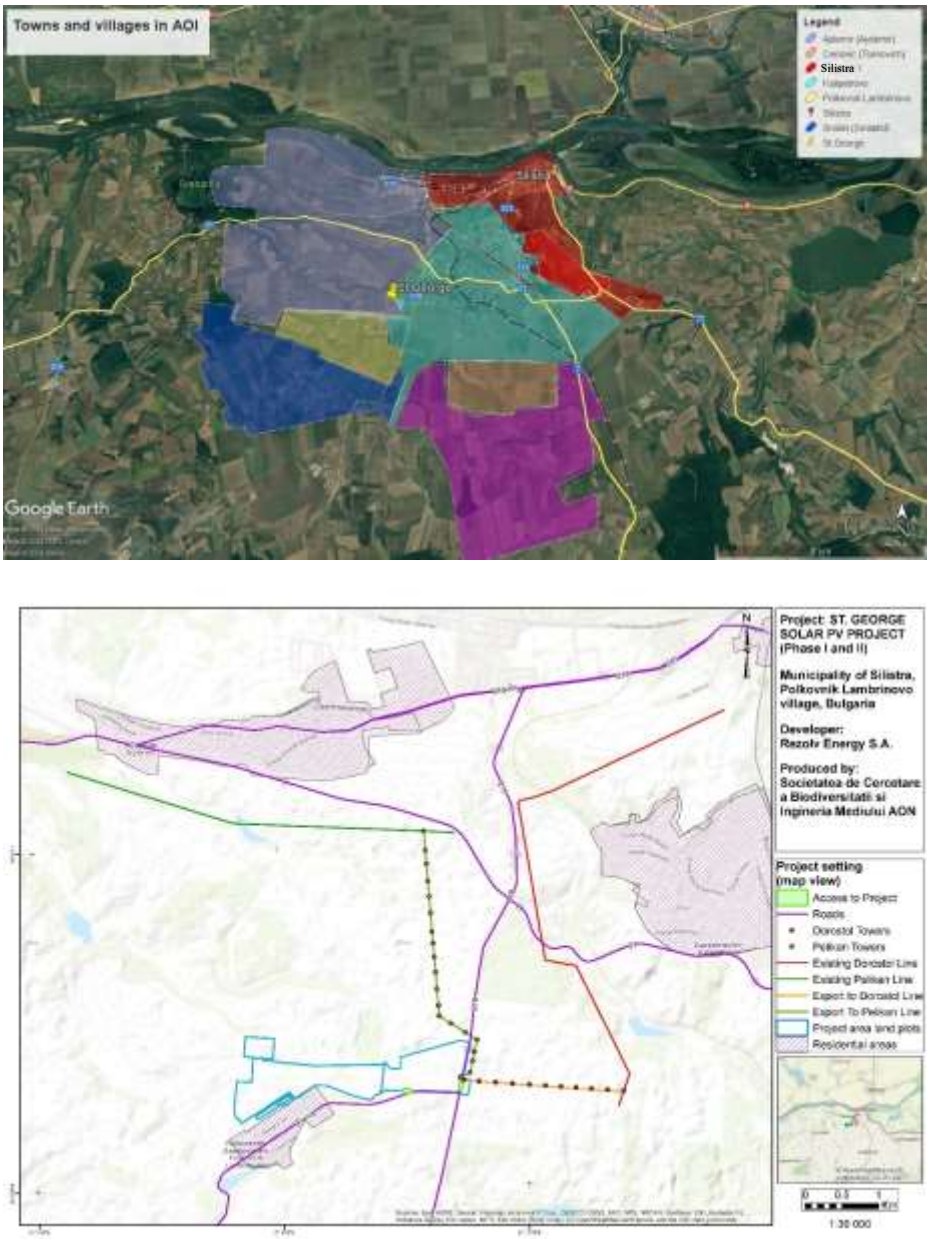


Figure 82: Residential areas in the direct AOI.

6.17.2. Socio-economic baseline methodology

Stakeholder engagement activity undertaken to date has consisted of field observations and field research with the identified affected communities including:

- Perception survey - one-on-one interviews with 110 persons for the purpose of getting information about stakeholders perceptions of the Project. The qualitative research was based on participatory observation during site visits in August 2023, gathering information regarding the stakeholder approach to the project, the quality of life of the inhabitants of the area, the necessity and opportunity of the investment. The qualitative component represents an exploratory approach, intended to gather spontaneous direct information from the site visits.
- Key informant interviews (KII) (May 2024);
- Focus Group Discussions (FGDs) (May 2024); and
- Face to Face Household socio-economic surveys (June 2024) - 18 households in Lambrinovo, 39 households in Aydemir, 21 households in Kalipetrovo and 10 households in Smilets.

The findings of the socio-survey, KII and FGD's are summarised in the following sections. The survey report is provided in Volume 3, Technical Appendix. The conclusions of the socio-survey, along with KIIs and FGD have been triangulated and incorporated into the secondary data collection provided in the sections below. Further information on the methodology of the KII's, FGD's and S/E survey are provided below.

6.17.3. Perception survey overview

The questionnaire covered subjects such as expected impact of the Project on the community, significant advantages and disadvantages, possible constraints in the implementation of the Project, expected benefits for the community, possibly affected activities during the construction phase.

Among the identified and questioned stakeholders were inhabitants of the area, landowners of the terrains situated in the vicinity of the Project, landowners of the terrains on which the Project will be, employees of an enterprise located in the area influenced by the project, entrepreneurs, teachers, owners of a local business, mayor of P. Lambrinovo Village, farmers in P. Lambrinovo, local policemen in Prof. Ishirkovo Village, employees of the Silistra City Hall and a ministry of interior employee. A percentage of 62,73% of the total number of participants was formed of residents of the area. The other presented groups were present in the survey in various other percentages. The second percentage was defined by employees of the area, present in the survey in 11,82%.A socio-economic field survey is planned to confirm and elaborate the desk-based baseline obtained to date and inform community development opportunities and preliminary impact assessment outcomes.

6.17.4. Key information interviews (KII)

KII have been conducted with:

- Seasonal residents
- Regional health facility in Kalipetrovo (2 outpatient clinics for primary medical care - individual practices) to confirm health information,
- Mayor of P-Lambrinovo
- Local business representative (from P-Lambrinovo).
- Road authority
- Young persons
  Accommodation providers in Silistra.

KII were conducted through phone interviews.

6.17.5. Focus Group Discussions (FGD) and vulnerable groups

It is also understood from secondary data collected to date that vulnerable groups identified in the directly affected communities mainly consist of women (as main party working in the home instead of in paid employment), low-income families, older adults (because of mobility issues), as well as the unemployed (especially unemployed youths). Twelve focus group for the three vulnerable groups (one per community)) have been conducted. The surveys were taken in a central location in each community and participants were identified with the support of the relevant local Mayor and random invitations by the survey team.

1. Women (number of participants) (P. Lambrinovo (3), Smilets (3), Aydemir (11), Kalipetrovo (6).
2. Older adults (retired) +65 (one FGD 5 to 10 persons) (P. Lambrinovo (3 – 2 men and 1 woman), Smilets (4 - 3 women and one man), Aydemir (5 – 3 women and 2 men), Kalipetrovo (5– 3 women and 2 men).
3. Youths (under 25) (one FGD 5 to 10 persons) (P. Lambrinovo (3), Smilets (4), Aydemir (2),

The findings of the FGD's have been included in the baseline section below and where appropriate considers in the impact assessment and with the identification of mitigation measures including focussed stakeholder engagement for the above groups going forward (to be described in the following sections).

6.17.6. Household socio-economic surveys

Administratively the Project is located in the Silistra Region, and project infrastructure affects the districts of Polkovnik Lambrinovo, Smilets, Aydemir and Kalipetrovo, which are identified as directly affected communities "AOI communities". There are two other communities in the region

that may incur secondary (indirect) positive and negative impacts. The total number of PAP in these villages is summarised in the table below.

Table 28: Breakdown of population data in Silistra region (2021)

	Polkovnik Lambrinovo (adjacent)	Smilets	Tsenovich [Cenovic]	Kalipetrovo	Aydemir
Population number (2021)	139	326	59	3,339	5,273
Male/Female split	M - 48.2%, F-51.8%	M – 172 (47.2%) F-154 (52.8%)	M – 30 (50.8%) F-29 (49.2%)	M – 1642 (49.2%) F-1697 (50.8%)	M – 2573 (48.8%) F-2700 (51.2%)
Age groups	0-14: 5 14-65: 76 65+: 58	0-14: 20 14-65: 142 65+ :164	0-14: 1 14-65: 22 65+: 36	0-14: 399 14-65: 1973 65+: 967	0-14: 595 14-65: 3283 65+: 1395
Age Distribution	80+ - 8 70-79: 37 60-69: 23 50-59: 23 40-49: 24 30-39: 6 20-29: 8 *10-19: 6* *0-9: 4*	80+ - 35 70-79: 85 60-69: 71 50-59: 49 40-49: 27 30-39: 24 20-29: 10 *10-19: 6* *0-9: 19*	80+: 6 70-79:23 60-69: 14 50-59: 11 40-49: 3 30-39: 0 20-29: 0 10-19: 2 0-9: 0	80+: 204 70-79: 460 60-69: 593 50-59: 565 40-49: 422 30-39: 365 20-29: 217 10-19: 255 0-9: 258	80+: 245 70-79: 678 60-69: 967 50-59: 960 40-49: 660 30-39: 662 20-29: 360 10-19: 344 0-9: 397

The following survey of directly affected communities (PV plant or OHLT, or both) have been undertaken.

Door to door interview with 18 households in Lambrinovo, 39 households in Aydemir, 21 households in Kalipetrovo and 10 households in Smilets. Respondents were 43 Male / 44 female. The socio-economic surveys are conducted by random door-to-door interviews starting at the residences closest to the project site and working south. A representative of the household is chosen to provide the survey. Only one representative per household has been interviewed[52]. To support participation the local mayor and community representatives informed the communities in advance to encourage participation. The interviewer held identification and introduced themselves as part of the Project following a standard opening text. Key information to be conveyed included:

A) Confidentiality
B) Introduction to the Project
C) Purpose of the survey

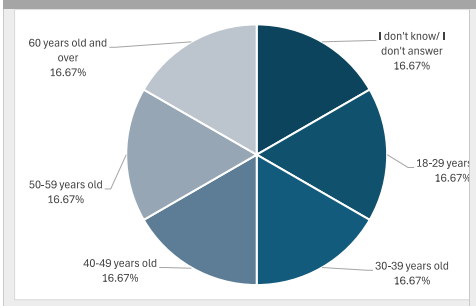
[52] During this time, any household members that may form part of community focus groups (women, youth etc) may be identified for subsequent inclusion inn FGDs.

Table 29: Proposed household survey breakdown

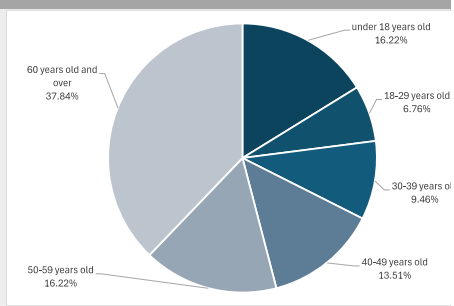
	Overall population size (excluding PAPs below age of 19)	Estimated households (based on 2 per household)	Number of households interviewed	Total PAPs (and percentage)	Male/female ratio (household head or interviewee)	Percentage of target households interviewed (based on an average of 2
Polkovnik Lambrinovo	129	65	18	28 (22%)	08-Oct	12%
Smilets	311	155	10	17 (5.4%)	05-May	6%
Kalipetrovo (OHTL infrastructure only)	2826	1413	21	35 (1%)	8/12 (1 not stated)	1.50%
Aydemir (OHTL infrastructure only)	5,273	2636	39	78 (1.5%)	22/17	3.40%
Total	8539	4269	89	158	43/44	22.9

6.17.7. Structure of the household based on the number of members and age

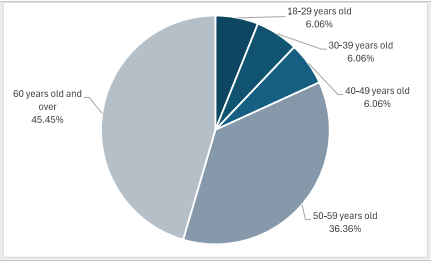
The following figures show the structure of the household for the PAHs interviewed.



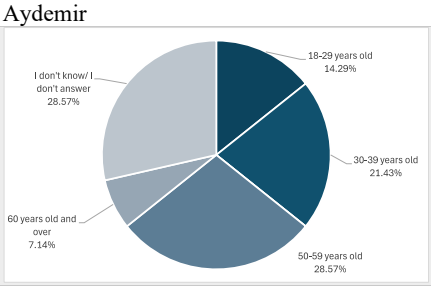
Lambrinovo



Aydemir



Kalipetrovo



Smilets

As previously mentioned, the survey gathered information from a total of 18 households in Lambrinovo. Most of the households present in the survey had one or two inhabitants. The six households that had two members were made up of husband and wife, most of them middle-aged. Only 2 households had 3 members. From the age perspective, the youngest member in the visited households was 19 years old while the oldest inhabitant was 77 years old.

The inhabitants in the households in Aydemir were a little more numerous than those in Lambrinovo. As illustrated above, 5,13% of the households in Aydemir (a total of 2 households) had 4 members, while 1 household had 5 members. However, most of the households in this settlement had only one member (12 households representing 30,77% of the total), while 28,21% (a total of 11 households) had 2 members. 9 households reported 3 members. According to the age distribution of the members of the Aydemir community, most of the participants in the survey are over 50 years old. Out of the total 74 participants in the survey, a total of 28 inhabitants (representing 37,84%) are aged 60 years old and over. Only 12 inhabitants are children (under 18 years old), this percentage representing 16,22% of the total number of participants in the survey.

The youngest inhabitant in the households in Aydemir is 4 years old, according to the survey, while the oldest inhabitant is 81 years old.

From Kalipetrovo, the number of households that participated in the survey was 21 families. The data has shown that the largest number of households, a total of 9 families representing 45%, were formed of only one member. 8 households in Kalipetrovo reported 2 members while only 3 households reported 3 members. One household didn't offer information regarding the number of members. In total, in Kalipetrovo were reported 34 participants. One participant refused to mention his age. From all the participants in the survey, the gathered data illustrate no member of the 21 families under 18 years old. The largest number of participants, 15 out of 33 are aged 60 years old and over while 12 family members are aged between 50 and 59 years old. The structure of the population in Kalipetrovo according to age is illustrated in figures below.

The structure of the population present in the survey in Smilets is defined by many households formed by only one member. Most of the members in these households are over 50 years old. Thus, there were present a total of 9 households in the survey in Smilets, representing a total of 14 members. A total of 6 members were part of a 1-person household while 2 households were formed of 3 members. Only one household contained 4 members. Regarding the age groups of the population, a total of 4 members of the households didn't want to mention their age. Other 4 inhabitants mentioned that their age is over 50 years old but below 59 years old. The youngest member of the households in Smilets is 24 years old while the oldest member is 71 years old.

The focus on the socio-economic surveys has been to identify further information not provided in secondary data sources, KII or FGDs on the following topics so as to enhance the socio-economic profile and understanding of impacts and to enable an assessment of the likely project impacts and benefit. All findings are reported in detail in Volume III and also included in the socio-economic baseline section provided below.

- Employment and livelihoods - including income, expenditure, occupation and income sources for economically active persons in the community and retirees, main threats to incomes, and challenges faced by household members at work),
- Accommodation, living conditions and household amenities - including whether PAPs own their properties or rent them and whether they live there all year round, who's name the property is in, access and reliability of utilities, heating and cooking fuels, waste management).
- Land tenure and land use, (including natural resource use) - agricultural land use, livestock ownership, any current or historical use of land directly impacted by the Project (to triangulate current understanding), including natural resources use e.g. foraging, firewood collection). Health – confirmation of absence of health services in the local communities and where residents travel to obtain different levels of health care when needed and information where possible on the quality of the services and equipment available, and information on predominant health issues including prevalence of sexually transmitted diseases, Gender based violence and child abuse current rates/prevalence, car accidents, key diseases/mortality rates (PAC level). Education - confirmation which schools children

in the community travel for primary and secondary education, traffic routes used to commute to school, and information on percentage of households that do send their children to school and typically to what level.

- Language and ethnicity – confirmation as to the ethnic composition of the community and preferred language uses.
- Culture, tourism and recreation – gather data on recreational facilities in the communities, and cultural features of importance (including religions data).
- Poverty and equity - information on annual incomes (average monthly salaries) for comparison against national averages and to understand levels of poverty and to understand whether current income levels are satisfactory and key expenditures.
- Vulnerable groups – collect information to identify the number of vulnerable people in the household (above 65 (elderly), below 25 and unemployed, and disabled. Information will be collected where possible on allowances (unemployment, child benefit) , access to state pensions).
- Gender relations (including human rights) – information on division of labour in the household / work between males and females, education levels of women .

A copy of the survey questionnaire is provided in Volume III.

6.17.8. Limitations

Commented [ND1]: Make subheading

The following limitations are noted:

- For the FGD's, and S/E survey it was difficult to meet the target sample size in some cases due to the availability of people in the villages at the time of the survey. Some residents are seasonal /weekend residents and as such they were not available, others were at work or out of town. Separate KII were held over the phone with seasonal residents, to ensure that the views of these residents (which may be different from permanent residents) are included in the baseline description.
- The views of the vulnerable persons may not have been heard fully. Although people over 50 and women were well represented in the S_? survey sample and the FGD survey sample it is recognised that not all women or older adults are vulnerable and therefore it is still possible that some key considerations from members of these "vulnerable" categories may still not have been heard. It will be necessary to ensure that continued engagement with these groups to ensued that the vies of all vulnerable residents are taken into account during the construction phase.
- The number of households interview in Kalipetrovo and Aydemir are low due to the lack of interest in participating. These communities will not be directly affected and are included as some households belonging to these communities will be affected by the OHTL. These specific project-affected-people will be surveyed in more detail as part of the LRP. The findings of the LRP, including any specific mitigation measures e.g. engagement or construction management will be incorporated into the proekct management plans. Furthermore, it is noted that based on the similar answers provided by these communities, the populations in these communities are relatively homogenous and therefor these is still some confidence in the characterisation provided below.

Despite these limitations, we note that the responses were relatively homogenous and aligned with responses from KII, FGD, interviews with the local mayor. Based on this triangulation, there is still a high level of confidence in the reported baseline.

6.17.9. Demographics

[53]In January 2012, Silistra was inhabited by 35,230 people within the city limits, while the Silistra Municipality along with the legally affiliated adjacent villages had 50,780 inhabitants. The number of the residents of the city (not the municipality) reached its peak in the period 1986–1991, when it exceeded 70,000. The current population of the region is just under 30,000. The following table presents the change of the population since 1887.

According to http://pop-stat.mashke.org/bulgaria-division.htm population of Silistra Municipality in 2023 is 40686.

Table 29: Population data Silistra

Silistra														
Year	1887	1910	1934	1946	1956	1965	1975	1985	1992	2001	2005	2009	2011	2021
Population	11,415	11,046	> 17,415[9]	15,951	20,350	33,041	59,296	70,537	49,304	41,952	39,358	37,837	35,607	29,498
	Highest number **70,537** in **1985**													

Generally, the population in the rural villages is on the decline and the gender split between men and women is approximately equal with slightly more females than males. As indicated by the census date for 2021 and following typical norms in Bulgaria, the majority of households in the direct AOI communities are expected to be male headed households[54]. For the directly affected communities the age groups 40+ are predominant with the 60 to 69 and 70 to 79 age groups typically making up the largest individual age group. The number of young people in the Project Aoi are summrised in Table 30. This breakdown was confirmed by the findings of the socio-economic survey which found that Lambrinovo, Aydemir, Kalipetrovo and Smilets have similar communities, mainly characterized by elder population (*mostly retired inhabitants*). The households are formed generally of one or two members.Key population data from the 2021 census for the direct and indirect project affected communities is provided in Table 30. This data supports the findings of the quantitative surveys performed to date where the majority of the participants interviewed were in the over 65 age group reflecting the fact that most of the residents of the local communities are in the older age bracket reflecting the demographic ageing processes evidence in this area.

10 to 30% of P. Lambrinovo residents (total of 11 residents) are seasonal residents, predominately above the age of 40, who visit the area seasonally. Typically, these residents reside permanently in P. Lambrinovo from May to October and then visit on weekends only from November to April and always on public holidays. P. Lambrinovo is particularly well suited for this type of residency as it is close to Silistra but offers a peaceful retreat from the city. No seasonal residents rent out their accommodation to third parties some or all of the time and none would consider renting their property for project use (reference KII).

[53] https://en.wikipedia.org/wiki/Silistra

[54] To be confirmed during ongoing socio-economic survey work

Table 30: Breakdown of population data for PACs[55]

	P. Lambrinovo (adjacent)	Smilets	Tsenovich [Cenovic]	Kalipetrovo	Aydemir
Population number (2021)	139	326	59	3,339	5,273
Number of households[56]					
Population change % [2011-2021]		-1.2	+3.5	-2.3	-1.4
Area (km^2)	9.66	28.00	8.868	48.57	64.75
Population Density (per km^2)	14.387	11.64	6.653	68.74	81.44
Male/Female split	M - 48.2%, F-51.8%	M – 172 (47.2%) F-154 (52.8%)	M – 30 (50.8%) F-29 (49.2%)	M – 1642 (49.2%) F-1697 (50.8%)	M – 2573 (48.8%) F-2700 (51.2%)
Age groups	0-14: 5 14-65: 76 65+: 58	0-14: 20 14-65: 142 65+ :164	0-14: 1 14-65: 22 65+: 36	0-14: 399 14-65: 1973 65+: 967	0-14: 595 14-65: 3283 65+: 1395
Age Distribution	80+ - 8 70-79: 37 60-69: 23 50-59: 23 40-49: 24 30-39: 6 20-29: 8 10-19: 6 0-9: 4	80+ - 35 70-79: 85 60-69: 71 50-59: 49 40-49: 27 30-39: 24 20-29: 10 10-19: 6 0-9: 19	80+: 6 70-79:23 60-69: 14 50-59: 11 40-49: 3 30-39: 0 20-29: 0 10-19: 2 0-9: 0	80+: 204 70-79: 460 60-69: 593 50-59: 565 40-49: 422 30-39: 365 20-29: 217 10-19: 255 0-9: 258	80+: 245 70-79: 678 60-69: 967 50-59: 960 40-49: 660 30-39: 662 20-29: 360 10-19: 344 0-9: 397

[55] https://citypopulation.de/en/bulgaria/silistra/silistra/ for the year 2021.

[56] Household information to be confirmed during ongoing socio-economic survey work

Silistra district is predominantly rural outside the town of Silistra.

6.17.1. Economy

Silistra region is located in Northeastern Bulgaria, in the plain region, part of Dobruja. The territory borders Romania along the right bank of the river Danube, as well as by land with the municipality of Ostrov on Romanian territory. To the west and in the southwest it borders the regions of Ruse and Razgrad, and in the south and southeast with Shumen and Dobrich.

According to NSI data, the population of Silistra region as of 31.12.2011 numbered 118,433 people, which is 1.6% of that of the country. 118 are included in the district settlements - 5 cities and 113 villages. The territory of the district covers 2846.285 sq. Km (2.6% of the country's territory).

The built infrastructure of the ports of Silistra and Tutrakan ensure the connections of the country through the Danube River with the Central European countries to the west and through the delta of Danube river - to the east. A European transport line passes through the territory of the district Corridor No. 7 (along the coast of the Danube River).

Out of all 7 municipalities in the district, 5 are peripheral, bordering and are the village of potential for cross-border cooperation with municipalities from the Republic of Romania. The distance to the Romania border is 9 km in a straight line.

In 2011, 3,801 non-financial enterprises operated in the Silistra region sector or 1% of those in the country. The persons employed in them, who are 35,438, are distributed according to municipalities with the highest share in Silistra - 53.1%, followed by the municipalities of Dulovo - 20.0%, Tutrakan - 12.4%, Glavinitsa - 6.8%, Sitovo - 3.4%, Kaynardzha and Alfatar - 2.2%.

Economic activity in the Silistra district is not high. The level of entrepreneurship is 32 (number of companies per 1000 people) and is significantly lower than the national average. For the period 2007-2011 the number of companies increased by 310, but these are mainly micro enterprises, mostly without employees. The number of terminated enterprises increased in 2010-2011 – 337 and 321 companies, respectively.

The main economic activity in P.Lambrinovo is agriculture, food and wood processing industry (one business). When asked about the main occupations of the people in the four settlements of the survey, the participants mentioned mostly agriculture or the fact that the inhabitants are mostly retired. Some residents work in low-skilled jobs.
Information from the KII that operate business in P.Lambrinovo indicates that the benefits of operating a business from this region are that the region is close to Romania for export, removed from the city and benefits from a less densely populated areas reducing issues related to dust and noise.

6.17.2. Employment income and living standards

Silistra is the district with the lowest GDP per capita and despite this, it has been growing at a relatively slower pace to reach 7,700 BGN/person in 2019, compared to the national average of 17,200 BGN/person. Salaries in the district have remained relatively low as well. The average gross annual salary in 2019 amounted to 10,600 BGN, compared to 15,200 BGN in the country. Household incomes have recorded a more significant increase: they reached 5,700 BGN/household member, compared to 6,000 BGN in the country. The average wages in the direct AoI f is reported as between 2500-4000 BGN (1250-2000 EUR) per month for skilled workers and 1200-2000 BGN (600-1000 EUR) per month for unskilled workers which is below the national average. There is no informal income market in the area (e.g. bartering).

Hiring is often undertaken in an informal way or through the Employment Bureau in Silistra where formal job adverts can be placed, however the availability of workers with relevant skills in the area is low, except for drivers, and often hiring announcements have limited success. The labour workforce in the area can generally be considered to have limited vocational skills and often low education levels. There are no formal business community groups or business support groups in P. Lambrinovo or wider area although informally business owners do discuss matters of mutual interest.

6.17.3. Ethnicity

According to the latest 2011 census data, the individuals declared their ethnic identity were distributed as follows:

- Bulgarians: 29,677 (88.3%)
- Turks: 3,458 (10.3%)
- Romani: 123 (0.4%)
- Others: 190 (0.6%)
- Indefinable: 180 (0.5%)
- Undeclared: 1,979 (5.6%)
- Total: 35,607

In the AOI, it can be considered that the majority of the population will be Bulgarian. From KII, it is reported that in P.Lambrinovo the ethnic split is reported as 97% Bulgarian with 1% Roma and 2% Turk.

The socio-economic survey further indicated the population living in Lambrinovo, Aydemir, Kalipetrovo and Smilets is a relatively homogeneous one in terms of ethnicity, language and religious beliefs. Thus, when asked about the ethnicity, all the members of the households in all the four settlements (Lambrinovo, Aydemir, Kalipetrovo and Smilets) mentioned the Bulgarian ethnicity. Furthermore, the language is Bulgarian

6.17.4. Public health services and health status

Table 31 provides an overview of the health facilities in the Silistra region. There are no reported health clinics in P. Lambrinovo, Smilets, or Kalipetrovo. The main health issues faced by project affected community members are heart issues, high blood pressure and women related matters.

There are no mobile health services that come to the project affected communities.

Table 31. Network of healthcare facilities - 2019

Populated place	Types of medical facilities by service levels
Silistra town	General hospital for active treatment
Silistra town	Emergency Medical Center
Silistra town	21 number of outpatient clinics for primary medical care - individual practices
Aydemir village	4 outpatient clinics for primary care - individual practices
Kalipetrovo village	2 outpatient clinics for primary medical care - individual practices
Bradvari village	1 number of outpatient clinics for primary medical care - individual practices
Prof. Ishrkovo village	1 number of outpatient clinics for primary medical care - individual practices
Silistra town	47 outpatient clinics for specialized medical care - individual practice
Silistra town	1 outpatient clinic for specialized medical care - group practice
Silistra town	4 pieces Medical-diagnostic laboratory
Silistra town	45 pcs. outpatient clinics for primary dental care - individual practices
Silistra town	2 pieces for specialized dental care - individual practice

Source: Silistra municipality

In 2020, the healthcare system in Silistra district continued to suffer from a shortage of both doctors and beds in the local general hospitals. One local GP was caring for 2,193 persons on average, compared to 1,727 persons per doctor in the country. The shortage of specialist physicians is also acute[57]. Kalipetrovo has 2 general practitioner services, one with one doctor and the other with two doctors. These doctors do home visits where required.

The nearest accident and emergency (A&E) service is in Silistra town it is suitable to deal with all types of major accidents into major trauma. The number of beds in the local general hospitals has continued to increase in the past few years, but their relative proportion remains relatively low – 4.5 beds per 1,000 persons, compared to 5.5 beds per 1,000 persons in the country. The relative number of patients treated in the local general hospitals is 180 per 1,000 persons compared to 138 per 1,000 persons nationwide. The infant mortality rate has doubled and exceeds the national average.

In parallel with the medical institutions in the city of Silistra, outpatient clinics (with individual practices) also operate in the settlements of Professor Ishirkovo. Silistra and Bradvari. The nearest clinic services are in Iskrkovo and Silistra town.

[57] source https://www.regionalprofiles.bg/var/docs/2021en/17Silistra_EN_21.pdf)

Dental care is provided in the city of Silistra in 45 units. outpatient clinics for primary dental care - individual practices and 2 pcs. outpatient clinics for specialized dental care - individual practices.

Health services in the project affected communities are summarised in Table 32.

Table 32: Health services for the project affected communities

	Lambrinovo	Aydemir	Kalipetrovo	Smilets
Health services	-	Hospital, doctor, clinic		-
Nearest clinic	Silistra	Silistra	Silistra	Silistra
Means of transport	Car, public transport	Car, public transport	Car, public transport	Car, public transport
Distance and time	15 km (20 minutes)	5 km (10-15 minutes)	5 km (10-15 minutes)	10-15 km (15-20 minutes)
Most common diseases	-	flu, respiratory diseases, high blood pressure, cardio-vascular diseases, diabetes, headaches and eyesight	respiratory, high blood pressure, cardio-vascular diseases, sinusitis, diabetes, headaches and eyesight	flu, respiratory, high blood pressure, cardio-vascular diseases, diabetes, headaches, eyesight

Source.: S/E baseline June 2024

The levels of satisfaction with the health and education services declared by the communities in Lambrinovo and Aydemir are relatively low. Most of the inhabitants in Lambrinovo declared themselves unsatisfied with health (and educational services, see next section). In Aydemir, the participants declared themselves mostly unsatisfied with the health services while the educational services were mentioned only occasionally as unsatisfactory. For the population in Kalipetrovo, both health and educational services are satisfactory. The population in Smilets mentions that the settlement needs more specialists in the health services while the educational services are described as satisfactory (although many of the participants mention that they don't interact too often with the educational system).

In the municipality of Silistra, social activity is well developed based on the needs of social services, in partnership with the interested parties in the municipality. It covers vulnerable communities and different age groups on the territory of the municipality.

Gender based violence support services are available in Silistra, further information is provided in section 6.17.7. Domestic social care is the most comprehensive service that is provided on the

territory of the municipality from the municipal budget. It is provided to people in need of social care (elderly people living alone with disabilities or with difficulties in self-care who need care in a family environment), with a capacity of 300 places.

Overall, while life expectancy in Bulgaria increased overall from 71.6 years in 2000 to 73.6 years in 2020, as of 2020 it remained the lowest in the EU, and a full 7 years below the EU average in 2020. Stroke was the leading cause of death in Bulgaria in 2018, accounting for nearly 20 % of all deaths followed by Mortality from ischaemic heart disease accounting for 11 % of all deaths. In 2019, two thirds of Bulgarians reported being in good health, which is close to the average for the EU as a whole (69 %) (Figure 4). However, as in other EU countries, large disparities exist across income groups. More than four in five people in the highest income quintile considered themselves to be in good health, compared with only about half of those in the lowest.

6.17.5. Nursery and public education services

The data from Table 33 show that four nurseries and one children's kindergarten are functioning in the municipality of Silistra. There are no education or childcare facilities in the Direct AOI communities except Kalipetrovo. The following information covers the indirect AOI communities.

In Silistra, there are 280 children in the crèche and 350 in the children's kindergarten.

Table 33: Nursery – 2020

Nursery	Populated place	Number Covered
Nursery "Zdravets"	Silistra	129
Nursery "Child's Joy"	Silistra	77
Nursery "Bodra Smyana"	Silistra	50
"Scarlet Poppy" Nursery	Aydemir village	24
Children's kindergarten	Silistra	350

Note: In the nurseries and Children's kindergarten, children are accepted all year round (there is no school year). Source: Silistra municipality

Between 4 and 10 children from P. Lambrinovo and Smilets go to kindergarten or school by personal or public transport using the main road to Silistra.

The scope of the education system depends on the contingents of children of the relevant age (subject to pre-school education and school age) and the built infrastructure of education in the municipality. In the territory of the municipality of Silistra during the academic year 2019/2020, the following objects of education are functioning:

- Kindergartens - 10
- Profiled high schools - 2
- Secondary school - 1
- Unified School - 1
- Sports school - 1

- Vocational high schools - 5
- Primary schools - 5
- Support centre for personal development - 4
- Specialized service unit - 1.

The average capacity of a group in kindergartens in the municipality of Silistra is 28.5 children.

The district's performance as regards the indicators for education is unsatisfactory. The rate of enrolment in 5th to 8th grade was considerably below the national average in 2019 – 80.2% in Silistra district, compared to 86.5% nationally. The share of repeaters was still comparatively small, but that of dropouts from primary and secondary school remained relatively high – 4.5% in 2019, versus 2.5% countrywide. The number of teachers continued to rise in 2020 and reached proportions considerably higher than the national average. There are now 97 teachers per 1,000 students, compared to 87 teachers per 1,000 students nationwide.[58]

The network of educational facilities for the academic year 2019/2020 includes:

- Elementary School "St. Cyril and Methodius", the city of Silistra - 68 traveling students the village of Aydemir and the village of Srebarna
- Elementary School "St. Cyril and Methodius", the village of Kalipetrovo - 20 traveling students from the village of Babuk
- ObU "St. Cl. Ohridski", the village of Professor Ishirkovo - 119 traveling students from the village of Yordanovo, the village of Smilec, the village of Bradvari and the village of Kazimir
- Number of traveling students from settlements without schools (number by settlement): from Aydemir village - 384; from the village of Srebarna - 23; from the village of Babuk - 33; from the village of Sratsimir - 3; from the village of Smilets - 7; from the village of Yordanovo - 108; from the village of Kazimir - 2.
- The network of educational facilities in the municipality of Silistra in the academic year 2019/2020 and their condition is presented in the following table 14.
- Traveling students from settlements where there are primary schools but no high schools: from the village of Kalipetrovo - 94; from the village of Bradvari - 6.
- The avaible educationoal options are summarised in Table 34.

Table 34: Educational facilities in the project affected communities

	Lambrinovo	Aydemir	Kalipetrovo	Smilets
Easy access to educational services	NO	NO	YES	NO

[58] source: https://www.regionalprofiles.bg/var/docs/2021en/17Silistra_EN_21.pdf

	Lambrinovo	Aydemir	Kalipetrovo	Smilets
Nearest school	Silistra	Silistra	Kalipetrovo	Silistra
Means of transport	Public transport	Car, public transport, on foot	On foot	-
Distance to nearest school	15 km	8 km	-	-
Distance to nearest kindergarten	15 km	500-700 m	10 minutes	10-15 km (20-25 minutes)
Distance to nearest primary school	15 km	8 km	15 minutes	10-15 km
Distance to nearest secondary school	15 km	8 km	-	10-15 km
Distance to nearest high school	15 km	8 km	-	10-15 km

Branches of 2 Higher Education Institutions operate in Silistra:

- Higher School of Agribusiness and Development of the Regions: In the Academic and Scientific Center of the Higher School in the academic year 2019/2020, there are 212 students, of which 200 are part-time. The majors are Tourism Economics, Agricultural Economics, Agribusiness Management, Human Resource Management, Business Management, Regional Economics and Management, Accounting, Accounting and Auditing, Finance and Finance and Banking.
- "Angel Kanchev" University of Rousse - Silistra Branch: During the academic year.

In 2019/2020, 196 students are being taught full-time and part-time.

The specialties offered by the Branch are Pedagogy of learning in Bulgarian and foreign languages, Pedagogy of learning in physics and informatics, Modern educational technologies in kindergarten and primary school, Electrical engineering, Automotive engineering.

The main percentage of the population is formed of long-term university education, master, PhD. They represent 38,18% of the participants, while the specialized or technical post-secondary education for foremen graduates represent 32,73%. The distribution of the population according to their educational background reveals a mixed population, formed of both highly educated people and middle educated people. Most further education age children in P. Lambrinovo, Smilets, Kalipetrovo indicate no desire to go into further education due to the distance of the nearest university and the need to balance this against the cost of going and the need to contribute to the household income.

6.17.6. Tourism

Tourism has opportunities for development in the municipality of Silistra. A number of tourist attractions are located on its territory: the Danube river; Danube Park (the first public park in the country, founded in 1895); Durostorum-Druster-Silistra Archaeological Reserve; Mejidi Tabiya Fortress (a well-preserved Turkish defensive fortress dating from 1847); regional historical museum; fortress Roman town villa (dating from the 2nd century); Roman tomb (from the 4th century); "Srebarna" Biosphere Reserve; Patriarchal Cathedral Church and Patriarchal Palace from the 10th century; and Cathedral Church "St. St. Apostles Peter and Paul" in Silistra (built after the Crimean War). The natural features and available historical resources create favourable conditions for the development of various forms of sustainable tourism, cultural-historical tourism, eco-tourism, educational, fishing, and rural tourism.

It is important to note the cross-border geographical location of the municipality and the possibilities for cooperation with the Republic of Romania, as well as the Danube countries that this creates.

However, tourism is not a significant economic sector on the territory of the municipality and the region. The built tourist infrastructure in the municipality in 2019 includes: 16 places of accommodation, of which 11 are hotels; 329 rooms with 620 beds; tourist information center and tourist sites. Statistical data shows that the tourist flow in the period 2011-2019 is relatively constant at between 16 and 18%. The strongest years in the last decade are 2012 and 2019 Table 35. Tourism is not a significant industry in the area.

Table 35: Means of shelter and accommodation

Indicators	2011 г.	2012	2013	2014	2015	2018	2019
Means of shelter and accommodation[1] pc,	26	14	14	14	14	12	16
Beds, no.	595	521	514	514	549	543	620
Bed-nights, no.	209425	18883	18837	18837	18843	16447	19986
Rooms, no.	272	329	289	289	301	286	329
Realized nights, no.	30658	34928	28537	30024	29361	29886	34784
Persons staying overnight,	19558	21678	19148	20744	19774	20206	22892
Usability of the loglognosti, no.	14.6	18.5	15.1	15.9	15.6	18.2	17.4
Revenues from overnight stays, BGN thousand.	1441.1	1423.8	1119.2	1177.3	1223.8	1213.7	1442.0

[1] *Categorized shelter facilities and accommodation facilities with more than 10 beds that functioned in the respective year are included. Source: National Statistical Institute*

The utilization of shelter and accommodation facilities is low, even in the best year, 17.4% in 2019 compared to the national average (32.0%). For the hotel base, the usability is 18.5% against

39.5% for the country. This offers opportunity for project related accommodation needs to be met by the current hotel stock (subject to satisfactory standards).

The creation of tours is established as the most frequently applied approach to diversify the local tourism product and is the subject of a number of projects. On the other hand, in recent years the attitudes, expectations and profile of tourists have changed greatly - vivid experiences and unforgettable impressions, adventures, sports, an alternative to urban everyday life are increasingly being sought, in many places forms of non-standard tourism are developing - boat trips and boats, bicycle tours, fishing, culinary and folklore competitions, eco-tourism and observation of nature and rare animal and plant species, educational tours, tents and camping, ecological "brigades" of volunteers for the protection of natural areas, wine and culinary tourism.

In the territory of the municipality and the region, there are suitable prerequisites for the development of this type of tourist services, which do not require a large hotel base and expensive investments.

6.17.7. Gender

Figure 83 shows the population by age and gender for Silistra.

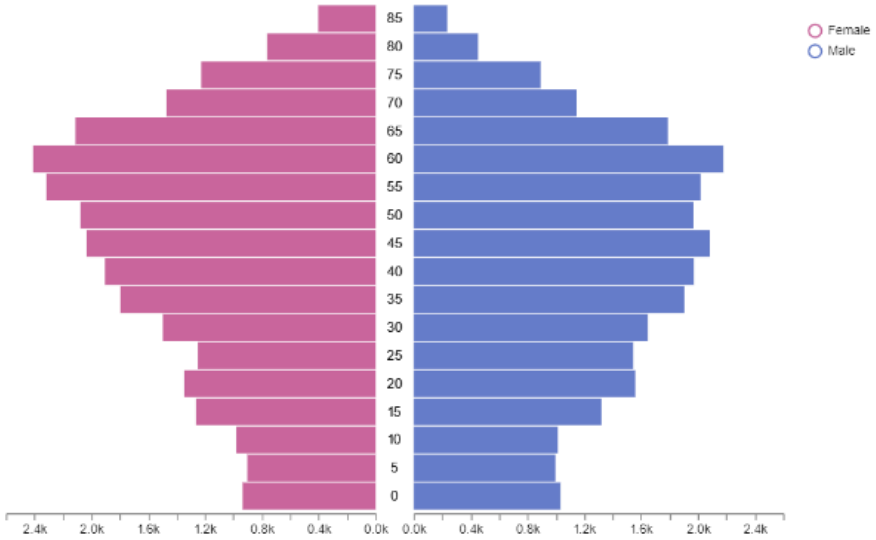


Figure 83: Silistra population tree - Population by age and gender.

(Source: https://www.city-facts.com/silistra/population)

The Republic of Bulgaria achieved a number of milestones in its progress towards gender equality and women's empowerment. In the area of legislation, the Gender Equality Act (GEA) was adopted in 2016 in Bulgaria as a framework for the national policy for gender equality. It is aimed

at promoting gender equality by creating the prerequisites to build an institutional environment and identifying the bodies and mechanisms implementing the national policy for gender equality. Under the GEA, the national policy for gender equality is based on the following principles: equal opportunities for women and men in all public, economic and political areas; equal access for women and men to all social resources; equal treatment of women and men and prevention of gender-based discrimination and violence; balanced representation of women and men in all decision-making bodies; and overcoming the gender-based stereotypes. It is implemented by integrating the gender equality principle into all national, regional and local policies, strategies, programmes and plans; application of provisional promotional measures; a horizontal intersectoral approach; a national institutional mechanism of cooperation between central and regional bodies of both the executive branch and civil society; and consistent and sustainable resource allocation and funding for the gender equality bodies and policy. The GEA regulates: (i) the National Gender Equality Strategy and plans thereto; (ii) the National Gender Equality Board ("National Board"); (iii) the Gender Equality Coordinators at the central and regional bodies of the executive branch; and (iv) the Badge of Distinction awarded for significant achievements in the effective implementation of the gender equality policy[59].

Gender-based violence (GBV) and domestic violence are serious problems in Bulgaria. According to a 2021 survey, over one-third of women aged 18-29 have experienced abuse by a current or former partner Bulgaria has adopted a law for protection against domestic violence. The Protection against Domestic Violence Act (PADVA) was promulgated in State Gazette, No. 27/29 March 2005 that is currently undergoing a review and update. Data for the region as to the prevalence of GBVH, child abuse, domestic violence at the community level is not available or not readily forthcoming, although FGD's indicated that is is not occurring or not widespread in the project affected communities.

For the Project Affected Communities there is one known women's service in Silistra, run by a local NGO (Ekaterina Karavelova)[60], The association runs a Crisis Center, a Center for public support, a Counseling center and domestic violence prevention and has 10 placements for women and their children. There are no dedicated sexual health or women's clinic in Silistra region. The Law on Protection Against Discrimination (Art. 17) provides for protection measures against sexual harassment in the workplace, and regulates that employers must hold inquiries regarding complaints and take measures to stop the harassment. There are no available statistics on the issues of GBV and sexual harassment (SH) in the workplace, but according to the 2011 European Risk Observatory Report by OSHA, approximately 2% of workers, both men and women, report bullying or harassment at the workplace. There is a strong NGO presence on issues such as sexual equality and women inclusivity. A particular focus of these organisations is the ill treatment of

[59] https://www.unwomen.org/sites/default/files/Headquarters/Attachments/Sections/CSW/64/National-reviews/Bulgaria.pdf . National report of the Republic of Bulgaria on the implementation of the Beijing Declaration and Platform for Action in the context of the 2020 Beijing+25 Global review and 5 years of the 2030 Agenda for Sustainable Development and its Sustainable Development Goals)

[60]

women and the problem of domestic violence. Among the most significant groups is the Animus Foundation, whose mission is to promote healthy communication between the genders in Bulgarian society. Their strategic goals include promoting gender understanding in society, encouraging the role of women as an intermediary between the government and NGOs, and coordinating activities that provide information about violence against women and children.[61]

The socio-economic household survey, KII and FGD revealed that typically the male head of the household is responsible for the main income, although some women reported that they have independent incomes or an income from a pension. Even so, most women reported that roles within the household are equally shared. Most women participate in caring for children and older family members, general household chores, gardening, farming for personal consumption, or are employed in Silistra. Most women leave the village between 2 and 5 days a week. When asked about the main challenges faced by women in their communities, most inhabitants mention that women play an equal role in the household to men and that they all face the same challenges with gender not being the driving factor. The main challenge mentioned in this survey is the lack of workplaces.

6.17.8. Vulnerable groups

Based on the information in the preceding sections, the vulnerable groups identified within the Project direct AOI can be grouped into categories of the elderly, youth, women, unemployed, Roma and Turks minority group and those people with disabilities. There are no displaced vulnerable groups affected by the Main PV site. Vulnerable persons connected with the OHLT land agreements will be determined during the preparation of the Livelihood Restoration Plan (LRP).

As described in section 6.17. the baseline data collection included FGD specifically with women, youths and older person. Based on FGD, key challenges for women, youth and older persons that must be considered in the following impact assessment are as follows:

- Youth – unemployment, lack of education opportunities close to home.
- Women – access to grocery shops and health facilities in the local villages (nearest options are in Silistra), access to jobs around childcare commitments, and lack of regular transportation to neighbouring villages and Silistra can also be an issue.
- Older persons – health care and low pensions/incomeoftern needing to be supplemented by money from family members.

6.17.9. Labor market / unemployment

In 2020, the development of the local labour market again remained unsatisfactory. Economic activity went down, and this was accompanied by a parallel drop in employment and a rise in

[61] https://api.fairwear.org/wp-content/uploads/2019/02/10.-Bulgaria-Gender-Fact-Sheet.pdf#:~:text=The%20Law%20on%20Protection%20Against%20Discrimination%20(Art.,measures%20to%20stop%20the%20harassment.

unemployment. The rate of economic activity reached 69.7%, compared to 73.7% in the country. The rate of employment shrank by over 4 p.p. to 54.1% and was the second lowest in the country (after Montana district), far below the national average of 68.5%. The unemployment rate went up by over 2 p.p. and reached 15.6% – another figure far more unfavourable than the national average of 5.2%. The labour market in Silistra district also suffers from the extremely poor educational structure of the workforce. The share of the working age population with university degrees constitutes 20.8% of the workforce, compared to 29.2% countrywide, and of those with primary or lower education – 30.7%, versus 16.9% nationwide. In the PACs, incomes are derived from agricaulture, jobs in Silistra. Many persons in PAC's are retired and realy on pension nincome and supplement that income by growing produce for their own consumption.

The population replacement rate as a ratio of those aged 15–19 to those aged 60–64 has been on the rise, but it still remains below the national average – 64.9% in Silistra, against 67.1 in the country. This means that for every 100 people who are about to leave the labour market in the next few years, there are 65 young people who will join the workforce. (Source: https://www.regionalprofiles.bg/var/docs/2021en/17Silistra_EN_21.pdf)

Table 36: Labour Market – Silistra region

Unemployment rate of the population aged 15-64 (annual average) (2022)	10.40%≥
Demographic replacement rate (2022)	53.60%≥
Employment rate of the population aged 15-64 (annual average) (2022)	56.30%≥
Relative share of the population aged 25-64 with tertiary education (2022)	21.60%≥
Relative share of the population aged 25-64 with primary or lower education (2022)	26.50%≥
Economic activity rate of the population aged 15-64 (annual average) (2022)	64.00%≥
Share of the working-age population (2022)	55.60%≥

Source: https://www.regionalprofiles.bg/en/regions/silistra/

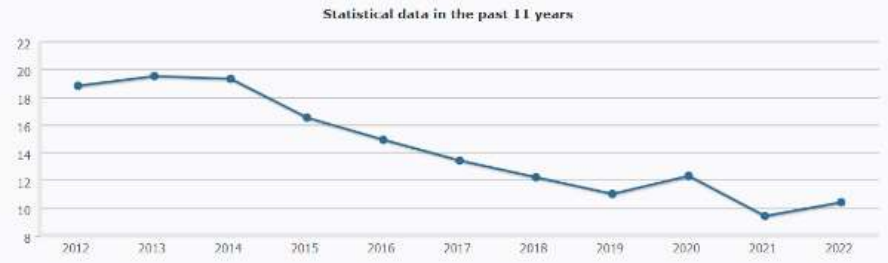


Figure 84: Unemployment rate of the population aged 15-64 (annual average)

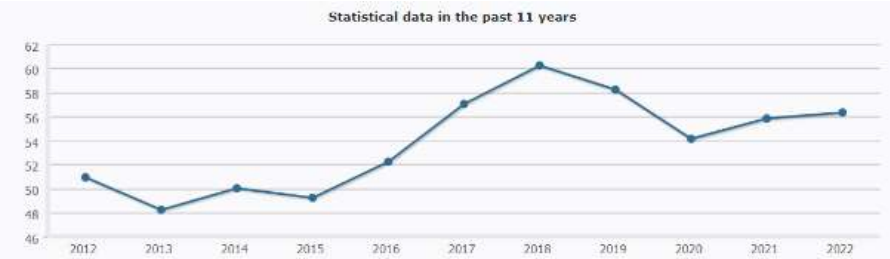


Figure 85: Employment rate of the population aged 15-64 (annual average)

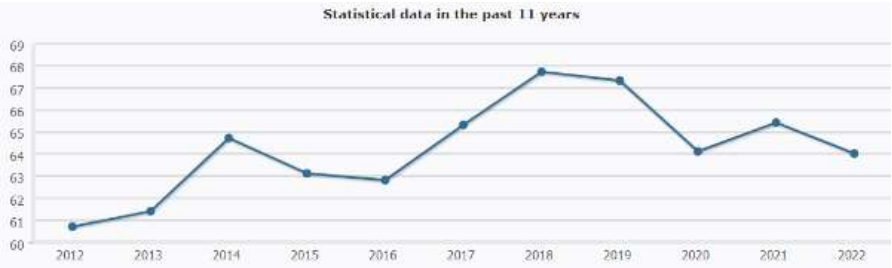


Figure 86: Economic activity rate of the population aged 15-64 (annual average)

Based on the age distribution in the direct AOI communities and supported by the KII and FGD outcomes, most employment age people have moved to other areas in search of work.

The relative share of the population living with material deprivation in Silistra district remained relatively small in 2019 – 15.5%, compared to 19.9% in the country, while the share of those living below the national poverty line was slightly above average at 24.0%, versus 22.6% nationwide. 62. The average unemployment rate (%) is 11.5%[63] for the district.

In P.Lambrinovo the unemployment rate is reported as 5% but this also reflects the low number of working age persons in the village. Employment opportunities in P.Lambrinovo, Smilets are limited in particular unskilled opportunities which are most relevant for young persons who have not left for further education or for work in Silistra. During the summer months additional seasonal employment may be available in the agricultural sector. The main challenges in the community that may impact on incomes are insufficient transportation to Silistra and low pensions.

[62] Source: https://www.regionalprofiles.bg/var/docs/2021en/17Silistra_EN_21.pdf

[63] Source: https://nsi.bg/en/content/11423/district-silistra

7. BIODIVERSITY IMPACT ASSESSMENT

7.1. Overview

The construction, operation, and decommissioning of the Project will generate a number of impacts on various sensitive biodiversity receptors. The Project has potential to generate the following types of impacts to sensitive biodiversity receptors:

- Introduction of invasive species;
- Habitat/vegetation loss and degradation (terrestrial);
- Disturbance to, and persecution of animals;
- Injury/death of terrestrial (non-flying) animals; and
- Bird collisions with powerlines (operation phase).

7.2. Receptor sensitivity

Table 37 summarises the relevant biodiversity receptors identified as priority biodiversity species in the direct and indirect AOI based on field observations and potentially relevant species identified in the Natura 2000 species list. This includes a review of surveys performed in the field (not the buildings) prior to habitat clearance (but not demolition of some buildings by the prior owner). The critical habitat screening 6.5 did not identify any critical habitat species as defied by IFC PS6. Priority biodiversity species has been defined as species that exhibit one or more of the following: IUCN VU or above[64]; species protected under the Habitats Directive (Annex I or II), Bern Convention (Annex II), Bonn Convention (Annex II); or species protected under Eurobats. Based on the field observations and data set review in Section 6.0, no critically endangered species (CrE) have been identified at the Project site. . One EN species (saker falcon) has been observed and is considered a priority biodiversity species . The remaining ten priority biodiversity species include one invertebrate, three reptile, three birds, three mammals and bats (including one bat species of IUCN VU) plus EU Nature Directive protected species status (see Table 37). This approach aligns with IFC PS6 and represents species which may experience impacts from the Project that are critical (critical habitat) and are therefore identified as potential key receptors.

With reference to the habitat maps (pre and post clearance) presented in Figure 36 and Figure 37 respectively, the habitat pre and post clearance is considered to be modified habitat with potential pockets of Natural Habitat (NH) remaining in the form of unmanaged xeric grassland which may not have been completely cleared at site at this time and is assigned a moderate sensitvity. For the remining habitat, given the general modified nature of the habits in the direct AOI of the PV project and OHTL all other habitats pre and post clearance are classed as modified habitats (i.e. urban and agricultural) and are assigned a low sensitivity. This includes the habitats along the OHTL which have not been cleared to date.

[64] IUCN criteria are dividing species into nine categories: Not Evaluated (NE), Data Deficient (DD), Least Concern (LC), Near Threatened (NT), Vulnerable (Vu), Endangered (E), Critically Endangered (CEn), Extinct in the Wild (Ew) and Extinct (Ex).

Key receptor species, derived from the pre and post clearance survey work, and their receptor sensitivity are summarised in Table 37.

Table 37: Receptor Sensitivity (biodiversity)

Receptors	IUCN	EE Nature Directives	Taxon	Distance from the site	Sensitivity
Terrestrial habitat in the direct AOI considered Natural Habitat (any remaining unmanged xeric grassland)	n/a	n/a	n/a	Direct AOI	Medium
Terrestrial habitat in the direct AOI and considered Modified habitat	n/a	n/a	n/a	Direct AOI	Low
Capricorn Beetle	VU	YES	Invertebrate	Direct AOI / indirect AOI	Medium
Meadow lizard	NT	YES	Reptile	Direct AOI / indirect AOI	Medium
Four-lined snake	NT	YES	Reptile	Direct AOI / indirect AOI	Medium
Hermann's tortoise	NT	YES	Reptile	Direct AOI / indirect AOI	Medium
Saker falcon	EN	YES	Bird	Direct AOI / indirect AOI	High
Red-footed falcon	VU	YES	Bird	Direct AOI / indirect AOI	Medium
European turtle dove	VU	YES	Bird	Direct AOI / indirect AOI	Medium
Barbastelle	VU	YES	Mammal (bat)	Direct AOI / indirect AOI	High
Bats	LC/NT	YES	Mammal (bat)	Direct AOI / indirect AOI	High

Under IUCN classification all bats except one are classed as IUCN LC, but all bats have EU Nature Directive classifications and are therefore all bats are considered to be species of priority biodiversity value. Furthermore, bats in the area have been impacted by the vegetation clearance already performed and therefore their capacity to absorb more change may be already limited. For the barbastelle, a 10% reduction in foraging areas and landscape elements is already estimated noting that there was only a single record in April 2023, probably during local migration where until that point, this species used the forest belts to search for food and to move. For the other

prevalent bat species that may be considered "local populations[65]" from the nearby settlements, these can be considered common species in the area, however it is estimated that up to 90% of their "local" foraging territory and perhaps up to 100% of the refuge area and buffer zones (forest areas) have already been removed. Because of this, bats are classified as having a high sensitivity to further work in the area not only due to their EU conservation classification, but also due to the vegetation clearance that has already been undertaken in the Project direct AOI.

The PV Project borders a Natura 2000 protected area. The Natura 2000 designation is one of terrestrial and inland waters and includes 22 species protected by the Nature Directives[66] and 13 habitat types protected under the Habitats Directive[67]. Of the 22 species, three are fishes and therefore not relevant to the Project Site. The remining 18 protected species are listed in Table 38 with their EU, IUCN and national conservation status and commentary as to their potential relevance to the Project as priority species for further assessment. These are also assigned a medium sensitivity.

[65] Nyctalus noctule, Nyctalus leisleri, Pipistrellus kuhlii, Pipistrellus nathusii, Pipistrellus pipistrellus, Plecotus austriacus, Eptesicus serotinus.

[66] Nature Directives refers to both the Birds Directive and the Habitats Directive

[67] https://eunis.eea.europa.eu/sites/BG0000169

Table 38: Natura 2000 species in nearest protected area (Ludogorie – Srebarna) (excluding fish)

Ref	Species scientific name	English common name	Species group	IUCN categorisation [68]	EU habitats directive [69]	Bern Convention [70]	Bonn Convention [71]	UNEP/EUROBATS [72]	CITES[73]	Relevance to Site / OHTL route
1	Bombina bombina	Fire-bellied toad	Amphibian	LC	Annex II, Annex IV	Annex II	-	-	--	May be a link across agricultural land to the north of the site.
2	Triturus dobrogicus	Danube crested newt	Amphibian	LC			-	-	-	Requires freshwater ponds, rivers for breeding.
3	*Cerambyx cerdo*	Linnaeus	Invertebrate	NT	Annex II, Annex IV	Annex II, revised Annex I of revolution 6	-	-	-	Potential target species

[68] https://eunis.eea.europa.eu/species

[69] COUNCIL DIRECTIVE 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CONSLEG:1992L0043:20070101:EN:PDF

[70] Convention on the Conservation of European Wildlife and Natural Habitats (Bern) (ETS No. 104) https://www.coe.int/en/web/conventions/full-list?module=treaty-detail&treatynum=104

[71] Convention on the Conservation of Migratory Species of Wild Animals (Bonn) https://www.cms.int/en/node/3916

[72] Agreement on the Conservation of Populations of European Bat https://www.eurobats.org/official_documents/agreement_text

[73] Convention on International Trade in Endangered Species of Wild Fauna and Flora

Ref	Species scientific name	English common name	Species group	IUCN categorisation [68]	EU habitats directive [69]	Bern Convention [70]	Bonn Convention [71]	UNEP/EUROBATS [72]	CITES[73]	Relevance to Site / OHTL route
4	*Cerambyx ornatum*	Capricorn Beetle	Invertebrate	VU			-	-	-	Potential target species
5	*Lucanus cervus*	Stag Beetle	Invertebrate	NT	Annex II / Annex III	-	-	-	-	Potential target species
6	*Lucaena dispar*	Large Copper	Invertebrate	LC	Annex II, Annex IV	Annex II, revised Annex I of revolution 6	-	-	-	Potential target species
7	*Morimus funereus*	Mulsant	Invertebrate	Not evaluated	Annex II	Annex II, revised Annex I of revolution 6	-	-	-	Potential target species
8	*Barbastelle barbastellus*	Barbastelle	Mammal	VU	Annex II, Annex IV	Annex II, revised Annex I of revolution 6	Annex II	Included	-	Potential target species
9	*Canis Lupus*	Wolf	Mammal	LC	Annex II, Annex IV, Annex V	Annex II, revised Annex I of revolution 6	Annex 2,	-	Annex 2a	Potential target species – although site is fenced so unlikely to be found on the site
10	*Mesocricetus newtoni*	Romanian hamster	Mammal	NT	Annex II, Annex IV	Annex II, revised Annex I of revolution 6	-	-	-	Potential target species

Ref	Species scientific name	English common name	Species group	IUCN categorisation [68]	EU habitats directive [69]	Bern Convention [70]	Bonn Convention [71]	UNEP/EUROBATS [72]	CITES[73]	Relevance to Site / OHTL route
11	*Miniopterus schreibersii*	Schribers bat	Mammal	VU	Annex II, Annex IV	Annex II, revised Annex I of revolution 6	Annex II	Included	-	Potential target species
12	*Mustela eversmanii*	Steppe polecat	Mammal	LC	Annex II	Annex II, revised Annex I of revolution 6	-	-	-	Potential target species - – although site is fenced so unlikely to be found on the site
13	*Spermophilus citellus*	European souslik	Mammal	VU	Annex II	Annex II, revised Annex I of revolution 6	-	-	-	Potential target species
14	*Varmela peregusna*	Marbled polecat	Mammal	VU	Annex II	Annex II, revised Annex I of revolution 6	-	-	-	Potential target species - – although site is fenced so unlikely to be found on the site
15	*Elaphe sauromates*		Reptile	LC	Annex II, Annex IV	Annex II	-	-	--	May be a link across agricultural land to the north of the site.

Ref	Species scientific name	English common name	Species group	IUCN categorisation [68]	EU habitats directive [69]	Bern Convention [70]	Bonn Convention [71]	UNEP/EUROBATS [72]	CITES[73]	Relevance to Site / OHTL route
16	*Emys orbivularis*	European pond terrapin	Reptile	NT	Annex II	Annex II, revised Annex I of revolution 6	-	-	--	Typically found in River's lakes and wetlands
17	*Testudo gracea*	Med. Spur-thighed tortoise	Reptile	VU	Annex II, Annex IV	Annex II, revised Annex I of revolution 6	-	-	Annex IIa plus EU Regulation [74]	
18	*Testudo hermanni*	Hermanns Mediterranean Tortoise	Reptile	NT	Annex II, Annex IV	Annex II, revised Annex I of revolution 6	-	-	Annex IIa plus EU Regulation [75]	

[74] COMMISSION REGULATION (EU) No 1320/2014 of 1 December 2014 amending Council Regulation (EC) No 338/97 on the protection of species of wild fauna and flora by regulating trade therein

[75] COMMISSION REGULATION (EU) No 1320/2014 of 1 December 2014 amending Council Regulation (EC) No 338/97 on the protection of species of wild fauna and flora by regulating trade therein

7.1. Construction phase impacts- PV

7.1.1. Habitats

Before the construction phase, a complete clearing of tree and shrub vegetation was performed in all areas described above. This was carried out in the period January - July 2023 and significantly changed the appearance of the territory. To begin with, tree and shrub vegetation was removed (January-April), and later grass in arable fields (May-July). Field survey work performed in March was able to assess pre-clearance habitat condition (as described baseline section) and therefor this -pre-clearance site condition has been used as the baseline for determining project impact (i.e in the pre-clearance habitat designation)

Impacts may arise from:

- Removal of vegetation - forest and grass - as breeding, development and food habitats;
- Excavation activities – temporary disturbance of breeding and development sites;
- Use of heavy construction equipment during construction - trampling of the soil - temporary disturbance of places for reproduction and development and death of individuals; and
- The affected species are widespread and the impacts on them in the project area can be determined as minor.

Direct habitat destruction

The planned PV Site is not part of the areas mapped as natural habitats subject to protection in protected area BG0000169 "Ludogorie - Srebarna" (SCI). The pre-clearance habitats affected by the project implementation (PV site and OHLT) consist of potential fragmented pockets of remaining natural habitat, anthropic habitats, agricultural crops, and abandoned airport runways with associated constructions.

Fragmentation of habitats

The investment proposal will fdoes not affect natural habitats subject to protection in protected area BG0000169 "Ludogorie - Srebarna" (SCI). Although E1.D is defined as Natural Habitat under IFC PS 6, in reality, the removal of EUNIS habitats E1.D, G1.C3, G5.1, J4.4 and I1.11 which are already fragmented coupled with the lack of a direct connection with habitats in the protected area is not considered to lead to further fragmentation.

Interruption of bio corridors.

No bio corridors have been established in areas of the investment proposal and have no direct connection with those in the nearby protected area BG0000169 "Ludogorie - Srebarna" (SCI). The actual elimination of EUNIS habitats E1.D, G1.C3, G5.1, J4.4 and I1.11 and the lack of direct connection with the protected area indicates no natural extension or structure that falls within the area of the investment proposal, and it does not lead to fragmentation. In all cases, the impacts above are considered permanent.

7.1.2. Invertebrates and amphibians

Disturbance may occur during construction and installation works, but it will be temporary and after the source is removed, the environment will restore the normal background. Considering that the habitats of the species in the protected area BG0000169 "Ludogorie - Srebarna" (SCI) are not affected, no impact is expected. There may be some impacted invertebrates in the PV Site., but this can be reduced because activities will only take place during daylight hours. Furthermore, all construction activities are phased, and this ensures that species can move out of the direct impact area around the PV Site. Even if mortality occurs in a given area of the investment proposal, the species will exist in another part of the territory and is expected to self-restore in a short time. An impact is expected, but it will be minor. Excavation activities may lead to temporary disturbance of breeding and development sites or formation of natural traps for species that may lead to mortality. Use of heavy construction equipment during construction may lead to trampling of soils and temporary disturbance of places for reproduction and development and death of individuals.

7.1.3. MAMMALS (except bats)

During the initial investigation phase, it was discovered that a wire fence approximately 1.80 meters tall was present; however, it was compromised in certain areas, failing to serve its intended protective purpose there. In the event that a complete fence is installed, a barrier effect can be expected for larger mammals such as: badger, fox, jackal, roe deer, wild boar, but as these are widespread species, this will not affect sensitive areas for them, and no significant impact is expected. For smaller mammals, this will not limit their spread.

Disturbance may occur during construction and installation works, but it will be temporary and after the source is removed, the environment will restore the normal background. Considering that the habitats of the species in the protected area BG0000169 "Ludogorie - Srebarna" (SCI) are not affected, no impact is expected, and it is considered the species will recover after the source is removed. Activities will only take place during daylight hours further reducing impacts.

7.1.4. Birds

The installation of PV panels will lead to covering part of the PV site with grass, shrub and tree vegetation, areas that are habitats of widely distributed species, but it will not actually lead to the disappearance of open habitats and those area now arable fields will become meadows and grassland type, given that the grass complexes formed must be maintained below the levels of the lowest point of the PV panel. Impacts that may occur include:

- Fragmentation of habitats

Fragmentation of habitats

The investment proposal does not affect effective habitats of species subject to conservation in protected area BG0000169 "Ludogorie - Srebarna" (SCI). Fragmentation is not expected. There will be a reduction in nesting sites for established bird species, but observing the changes in nesting

habitats and feeding sites that have already occurred, the species composition is generally maintained, thanks to available areas north and south of the PV area boundaries where arable land is also available and strips of trees (mostly acacia), i.e. since the same type of habitats are available in the surrounding areas and they have not been changed. As such, we can assume that significant fragmentation is minor, and in the future, the cultivated areas and cleared of trees will become meadows and they will recover their functions after construction is completed in the operation phase. There is a minor temporary impact on bird species.

Interruption of bio corridors.

No bio corridors have been established in areas of the investment proposal and have no direct connection with those in the nearby protected area BG0000169 "Ludogorie - Srebarna" (SCI).*The impact is not expected.*

Anxiety

Disturbance may occur during construction and installation works, but it will be temporary and after the source is removed, the environment will restore the normal background. Considering that the habitats of the species in the L-S Protected Area are not affected, no impact is expected, only on widespread species that will recover after the source is removed. Activities will only take place during daylight hours.

Mortality.

All construction activities are phased, and they are not related to impacts for a short period of time, and this ensures that even if mortality occurs in a given area of the investment proposal, the species will exist in another part of the territory, as for the time of impact in the next zone, typical habitats of widespread species, will self-restore in a short time. An impact is expected, but it will be minor.

7.1.5. Birds during migration

Direct habitat destruction

In general, yhe planned PV Site and OHLT is not part of the areas mapped as suitable for species subject to protection in protected area BG0000169 "Ludogorie - Srebarna" (SCI). Effectively occupied habitats and habitats of species are not affected, as such species are not established in the protected area. The territory for the PV Site and OHTL route is cleared of vegetation in the open areas, but also, in the case of the PV Site, also partially cleared strips of trees, which are characteristic resting and feeding habitats. In general, migratory bird species do not use the territory permanently. Mostly songbirds use the site for resting or looking for food e.g. Passeriformes, and predation (raptors). The predatory *F. vespertinus*, roosts in the trees at the northern and southern border of the airport, where trees are available.

One individual of the bird pf prey species - hawks (A*ccipiter*) was observed namely the Eurasian sparrowhawk (*Acc. nisus*), which was found to be trying to hunt Passeriformes birds during

migration, i.e. PV territories may be important for this species to hunt other migratory birds during migration.

During field observations at the PV site[76], species from the group of Passeriformes actively use the territory as a place to rest and search for food: *Al. arvensis, An. campestris, C. carduelis, G. cristata, P. montanus* and *S. spinus*, and from the predatory F. *tinnunculus, Acc. nisus and F. vespertinus*, roosts in the trees at the northern and southern borders of the airport, where trees are available, which are on the borders of the area intended for the construction of the PV Site.

If the construction activities coincide with the migration periods (March-May and August-October), then species attached to open spaces, mainly of the Passeriformes group, will temporarily have their resting and foraging sites disturbed due to the presence of humans, equipment and disturbed terrain during the operation of the machines for the construction of the installations. This in turn will also indirectly affect the predator species.

Despite the changes in the resting and foraging habitats, it is considered they will only have a temporary impact, since after the construction the territory will recover its vegetation and additional plant species will be introduced that are from the local flora and so in a short time, suitable habitats will be provided around the boundary of the site and under the PV panels.

The introduction of PV panels will result in the partial coverage of cleared zones with grass, shrubs, and tree vegetation which are habitats that host various widely spread species. This change, however, won't directly cause the disappearance of open habitats. Instead, the areas formerly used for agriculture will transition into meadows and grasslands. It's essential to ensure that the grass formations developed are maintained below the levels of the photovoltaic panel's lowest point.

Fragmentation of habitats

The investment proposal does not affect effective habitats of species subject to conservation in protected area BG0000169 "Ludogorie - Srebarna" (SCI). Fragmentation is not expected. There is only a temporary reduction in the resting and foraging areas of established bird species using the area during migration, which will re-establish in open areas forming meadows. And during the construction of the installation, the habitats for rest and feeding, the species composition will not change, thanks to available territories north and south of the borders of the territory for the FPP, where arable lands and strips of trees (mainly acacia) are also available. Since the same type of habitats are available in the surrounding areas and they have not been changed, we can assume that significant fragmentation is minor, but in reality, the cultivated areas and cleared of trees will become meadows and they will recover their functions after construction is completed in the operation phase. Minor impact on widespread species.

[76] Specific VP surveys along the OHTL route were not performed and are planned during the pre-construction phase to confirm similar conditions to the main site.

Interruption of bio corridors.

No bio corridors have been established in areas of the investment proposal and have no direct connection with those in the nearby protected area BG0000169 "Ludogorie - Srebarna" (SCI). The impact is not expected.

Anxiety.

Disturbance may occur during construction and installation works, but it will be temporary and after the source is removed, the environment will restore the normal background. Considering that the habitats of the species in the protected area BG0000169 "Ludogorie - Srebarna" (SCI) are not affected, no impact is expected, only on widespread species that will recover after the source is removed. Activities will only take place during daylight hours.

Mortality.

All construction activities are phased, and they are not associated with impacts in a short period of time and as migratory bird species use the area only to fly over it, rest or forage, but are a mobile group of animals, they can easily avoid life-threatening their factors, i.e. construction will not result in the mortality of individuals. No impact expected.

Table 39: Impact assessment - construction phase activities (flora and fauna - all species - PV)

Construction activities, foundation excavations, use and storage of fuels and chemicals, alterations in the hydrological pattern/ scheme, improper management of wastes and wastewaters – construction phase					
Type	**Duration**	**Extent**	**Frequency**	**Likelihood**	**Magnitude**
Direct	Medium-term	On-site	Temporary	Likely	High
Sensitivity					
Medium - High					
Overall Significance of Impact					
Moderate – Major					

7.2. Construction phase impacts- OHTL

Direct habitat loss and degradation impacts are expected to occur exclusively within the Project's construction and decommissioning phases, through the removal of existing vegetation and disturbance of existing soil/substrate by heavy machinery. Considering the proposed stringing technique, no habitat disturbance along the OHTL ROW is expected except within area required for tower footprints and access roads. Temporary habitat loss/degradation impacts are expected to occur in a somewhat larger footprint containing any areas that may be used as laydown or

staging areas during Project construction and decommissioning, restricted to these phases of the Project's life cycle.

Based on the distribution of species in the baseline section, the receptors most at risk of disturbance and habitat loss/degradation include sensitive species of reptiles and mammals. All of the sensitive species of terrestrial (non-flying) animals identified during the baseline study may experience either *habitat loss/degradation* impacts or *disturbance/displacement* impacts during the Project's construction. The construction period at any single work front is expected to be short-term (two to three weeks) and relatively low intensity, based on the required workforce and equipment required. Considering the small soil disturbance footprint of the Project, the agricultural nature of the land below the OHTL the habitat loss/degradation effects is considered to be low.

The presence of humans, vehicles, and heavy machinery within the Project area may result in the accidental introduction of invasive species. This impact could occur throughout the Project's life cycle, as a function of the level of human and vehicular traffic, thus concentrated within the construction and decommissioning phases. No invasive species were identified in the baseline mapping, but this should be checked prior to works commencing.

Table 40: Impact assessment - construction phase activities (flora and fauna - all species - OHTL)

Construction activities, foundation excavations, use and storage of fuels and chemicals, alterations in the hydrological pattern/ scheme, improper management of wastes and wastewaters – construction phase					
Type	**Duration**	**Extent**	**Frequency**	**Likelihood**	**Magnitude**
Direct	Short-term	On-site	Temporary	Likely	Medium
Sensitivity					
High					
Overall Significance of Impact					
Moderate					

7.3. Operation Phase impacts- PV

PV Projects are static and rarely staffed. These are mainly activities related to cleaning the vegetation around the panels and cleaning the panels from dust. This can cause anxiety for all groups of animals, but since the territory is large, it means that the animals will have time to leave the areas of human presence safely. Human interaction may also affect the food habitat for most animal groups, with invertebrates being particularly sensitive, as these activities will also change breeding and development sites, and even mortality during individual developmental stages. But

since these are widespread species, the overall effect on populations at the local, regional and national level will not be significant, and the surrounding territories near the investment proposal provide the same conditions for the development of the groups of species established during the field activities.

Illuminating the territory, as a precautionary measure to secure such installations, as practiced worldwide, can lead to the disturbance of certain mammal species and even act as a barrier. Otherwise, it can be beneficial for the group of insects, attracting them to these areas, and in turn, making it easier for amphibians and reptiles to find their food. If, however, lighting of the territory is planned, then this should be limited only within the limits of the investment proposal, and in the optimal version, it is most successful and will not cause negative effects if the lighting is activated only when there is established movement and the light source is in a spectrum without emitting in the ultraviolet range, which also attracts amphibians, rodents, insects and even birds.

When maintaining the territory and mainly when mowing the vegetation, there is a risk of mortality of the juvenile and adult forms of the Coleoptera group (invertebrates), since a large part of them are mainly creepers. The affected group are wide-ranging species, for which the impact can be defined as minimal and not significant, since the same species are also present in the indirect AOI, and they will quickly recover when vegetation is restored in the affected areas.

When maintaining the territory and mainly when mowing the vegetation, there is a risk of mortality of the juvenile and adult forms of the groups of amphibians and reptiles, since most of them are slow-moving. The affected group are wide-ranging species, for which the impact can be defined as minimal and not significant, since the same species are also present in the he indirect AOI, and they will quickly recover when vegetation is restored in the affected areas.

When moving equipment related to the maintenance of the facilities (in the area of the specific facility and on the airport runways and serving asphalt roads) it is possible to run over mainly young mammals from the group of Shrews (family *Soricidae*), moles (family *Talpidae*), rodents (family *Muridae* and Family *Arvicolidae*). Given that there is time for these animals to move out of the impact area and there are refuges around the perimeter of the site, this impact can be defined as minimal and not significant .

Birds during the breeding season

Since the nesting birds are widespread species, the overall effect on populations at the local, regional and national level will not be significant, and the surrounding territories near the investment proposal provide the same conditions for the development of the groups of species established during the field activities. It is expected that if there is ongoing activity at the site, the birds will be able to find alternative nesting areas around the site and adjacent fields. Furthermore, in support of this according to Montag, Hannah et al. (2016) the construction of photovoltaic installations, especially on the site of cultivated areas, can lead to a significant increase in the diversity, abundance and number of bird species compared to control areas (cultivated fields) that are located in close proximity to them. Cultivated territories, almost during all phases of

development of birds undergo changes related to land management and this leads to constant changes.

The use of pesticides and rodenticides significantly changes the appearance of territories in the fields and leads to the creation of monocultures, which leads to the merging of the species composition and the number of bird species, and often the ratio of fields/meadow is 1/2. While in the meadows and pastures, which will become the areas planned for the PV, the grass will be maintained by mowing and the preservation of the habitat in its entirety will be guaranteed without changes in species composition, number and abundance, number of pairs.

The perimetral lights used for security reasons of the PV Site, can lead to the disturbance of some species of birds, especially if ultraviolet spectrum is used, and even play the role of a barrier effect, but from on the other hand, it can be turn to be an attraction for the group of insects and small rodents, amphibians and woodpeckers by attracting them to these areas, which in turn can serve as food for mainly nocturnal birds - Strigiformes and find their food more easily. However, if lighting of the area is planned, then this should be limited only within the limits of the investment proposal, and in the optimal scenario, will not cause negative effects if the lighting is activated only when there is established movement(sensor equipment's) and the light source is in a spectrum without emitting in the ultraviolet range that attracts birds, as well as their potential food - amphibians, insects, insects.

Despite the changes in nesting habitats and feeding grounds, the species composition is generally preserved, thanks to available areas north and south of the boundaries of the PV site where arable land and strips of trees (mainly acacia) are also available, but also the conversion of the area under the panels into meadows/pastures. This ensures that bird species that have been identified during field surveys during the breeding season in open areas will re-establish and re-establish species such as: *Al. arvensis,G. cristata,L. collurio,Ph. Colchicus, M. calandra, Em. Hortulana, M. flava* which have moved into the ecotone zone in the northern and southern parts of the PV Site.

During the felling of strips of trees in the territory for the PV Site, some species are also affected, however, due to available areas north and south of the boundaries of the site for the PP, where arable land and strips of trees (mainly acacia) are also available, they will remain available for the area, and the conversion of the area under the panels into meadows/pastures will preserve their food habitats.

For nocturnal birds of prey, the species composition has not changed, but the number of pairs has been partially reduced by half. It is only possible for anxiety to occur if constant lighting is used on the territory and plays the role of a barrier and the presence of people and equipment during the night.

Bird collision mortality risk (with PV panels) can occur during project operation although the extent will be varying e.g., depending on weather/light conditions, operational activity within the PV Plant that will discourage bird presence.

Pre-construction surveys will be performed to identify presence of nesting birds and other priority biodiversity values to mitigate impacts

Birds during migration

Solar power plants are static and rarely manned. i.e. human presence and technology in the area is insignificant and the disturbance factor of the species is limited to a minimum. These are mainly activities related to cleaning of vegetation around the panels, cleaning of the panels from dust and current repairs and servicing of the territory. Bird migration covers two periods: March-May and August-October. Usually, these given periods are less associated with the presence of people and equipment related to mowing unwanted vegetation, since the same, especially in the autumn months, is not in active vegetation. It is only possible to apply this procedure in the month of May and this will be connected in the presence of people and equipment, but it will be short-lived, and it is possible to affect only species of the Passeriformes group, causing temporary disturbance and possible expulsion, but birds will occupy adjacent territories. No activities are planned during the dark part of the day, so no impacts are expected. During the maintenance of the installations and facilities, it is possible that people and equipment will be present, which will cause a temporary disturbance, but this will be short-lived and will not lead to changes in migratory species.

Perimetral lighting as a precautionary measure to operate such installations, as is the practice worldwide, may disturb or attract some bird species to the area and mislead them, especially if UV spectrum lighting is used and even to play the role of a barrier effect, but on the other hand it can be useful for the group of insects and small rodents, amphibians and woodpeckers by attracting them to these areas, which in turn can serve as food for mainly nocturnal birds - Strigiformes and made easier for them to find their food.

Maintenance activities of the territory and its management as a meadow with PV installations does not lead to the destruction of their habitats, but to the creation of conditions for enriching the species composition of possible food - rodents, insects, amphibians, reptiles and small mammals for migratory bird species - Falconiformes. It is only possible for anxiety to occur if constant lighting is used on the territory and plays the role of a barrier and the presence of people and equipment during the night.

Table 41: Impact assessment -operation phase activities (birds - OHTL)

Construction activities, foundation excavations, use and storage of fuels and chemicals, alterations in the hydrological pattern/ scheme, improper management of wastes and wastewaters – construction phase					
Type	**Duration**	**Extent**	**Frequency**	**Likelihood**	**Magnitude**
Direct	Permanent	On-site	Infrequency	Possibility	High
Sensitivity					

High
Overall Significance of Impact
Moderate

7.1. Operation Phase impacts- OHTL

Certain birds may become electrocuted and experience mortality during the Project's operations phase if they make simultaneous contact either with two different electrified parts of the OHTL, or with an electrified and a grounded part. This impact is generally limited to species of birds that exhibit behavioural tendencies to perch and/or nest on power line structures, such as many raptors, vultures, and owls. For the subject Project, sensitive species or species groups that may experience electrocutions include the Saker Falcon and other sensitive raptors. This impact generally occurs on the pylons/towers.

Certain types of birds may experience injury or death from collisions with powerlines during the Project's operations phase. Bird collisions may occur anywhere along the spans (line segments between pylons or towers) of the OHTL, and are generally concentrated where OHTL pass directly through, or in close proximity to water bodies, wetlands, or other habitats that are known to concentrate collision-prone bird species. Birds' susceptibility to collisions with OHTL varies substantially across species, with highest collision susceptibility generally associated with large-bodied bird species (in particular water birds). The possibility of bird collisions on the power lines is possible, although the lines do not cross any waterbodies.

To support this, pre-construction suveys will be performed along the OHLT route to confirm the basleie assumptions in this report. The results will be presented in the biodiversity management plan (BMP) for future monitoring.

Table 42: Impact assessment -operation phase activities (birds - OHTL)

Construction activities, foundation excavations, use and storage of fuels and chemicals, alterations in the hydrological pattern/ scheme, improper management of wastes and wastewaters – construction phase					
Type	**Duration**	**Extent**	**Frequency**	**Likelihood**	**Magnitude**
Direct	Permanent	On-site	Infrequency	Possibility	Low
Sensitivity					
High					
Overall Significance of Impact					
Moderate					

7.2. Decommissioning phase impacts

Conventional PV technology has an expected service life of 20 years. Given that the predictions are not related to the removal and significant disturbance of soils - laying cable routes, driving metal pylons and placing panels, inverters and others and air, water and other important components for the animal world are not affected - the technology is ecological clean and not associated with emissions in the abiotic factors of the environment, no significant impacts on biodiversity are expected. The removal of the panels, inverters, cable routes and other accompanying activities, by their nature, do not lead to significant impacts. Impacts can be expected with the use of heavy equipment, which can lead to trampling, running over and, as a result, even mortality of specimens mainly of amphibians and insects in different stages of development, especially in their larval forms. Mortality can also be caused in the mammalian group, but to a much lesser extent than in the rodent group. In order to establish the degree of impact, i.e. what are the potential types and effects on which to expect an impact, regular monitoring should be conducted to provide guidelines and even stages for decommissioning according to the results.

7.2.1. Mitigation and monitoring measures

The following mitigation and management measures are defined for the Project (OHTL and PV Project unless stated).

Table 43: Mitigation and monitoring measures (biodiversity)

Type	Mitigation and management measures
Design/Contract / Construction	• Prepare a biodiversity management plan (BMP) based on outcomes of ESIA baseline and pre-construction walkover to set forth all associated measures relevant to these values, including avoidance and minimization of disturbance to bird and mammal nests and bat roosts during the construction phase. • Conduct a pre-construction site walkover to identify habitat features at the PV site that are associated with the Natura 2000 Site, Natural Habitat and priority biodiversity values (i.e. nesting birds, European Ground Squirrel, Marbled Pole Cat and bats) • Conduct vantage point surveys of OHLT to confirm bird baseline along the OHLT route. • Assign biodiversity specialist, who will be responsible for the surveys, overall management, and reporting of all mitigation activities relating to the project. • Design where possible lighting that is activated to work only during movement and the emitted light should be outside the ultraviolet spectrum if possible - for some types of insects, amphibians and reptiles , this can reduce their barrier effect or disorientation in space. For nocturnal birds of prey, it will reduce the element of anxiety

Type	Mitigation and management measures
	• Before the start of construction and during all stages of the construction, a team of environmental biodiversity experts must be present to the territories and, if necessary, remove amphibians or reptiles from the areas intended for construction, in accordance with the construction scheme. Thus, the probability of mortality of individuals will be significantly reduced. • Check for introduction of species included in the list of invasive and potentially invasive alien species (of higher plants for Bulgaria, indicator SEBI10 - Invasive alien species for Europe (source EAES http://eea.government.bg/bg/soer /2010/biodiversitv-nem/biologichno-raznoobrazie-natsionalna-ekologichna-mrezha-1) • Raptor safe" pylon designs for the entire OHTL
Project Specific	• In the areas where no PV installations are constructed, but are part of the plant's service areas, grass and shrub vegetation should not be removed or should be revegetated. This will enable these areas to serve as temporary and permanent refuges for amphibians, reptiles, mammals and invertebrates • During construction, minimise impact to neighbouring territories - such as trampling, passage of heavy equipment, storage of materials and this will limit disturbance, reduce affected areas and will not be possible for potential death of individuals, i.e. the impact on species will be limited to the areas of construction and will not cause the same effects over larger areas. • Where possible, the storage of materials should be carried out only in areas around the airport runway - this will lead to limiting the effects of temporary soil damage and reducing the area for reproduction, development and foraging in most animal groups and will reduce the additional trampling of territory and changes in mechanical composition so important to invertebrates • All activities should be carried out only during the daylight hours to reduce the anxiety of nocturnal animals. • In the event that a fence is installed - provide access areas/passages through which rabbits, foxes, jackals, land turtles and other small species can pass. As the size of the opening must be not less than 40/40 cm for every 100 linear meters of length of the fence along its entire perimeter. • Reduce the speed limit of equipment and personnel vehicles to 20 km/h within the Lambrinovo airport's runway and road areas will significantly decrease the risk of amphibians, small mammals, and invertebrates being run over. • Apply a rotation scheme on small areas moving from east to west to remove vegetation around the PV facilities - panels, inverters and others in accordance with the instructions of an ecologist/biologist, as a result of monitoring (before starting removal activities of vegetation). This will enable species from the groups of amphibians, reptiles, mammals and

Type	Mitigation and management measures
	partially from invertebrates to move to neighbouring territories and limit disturbance and possible mortality. • Prohibit the use of herbicides to limit the spread of grass, tree and shrub vegetation in PP areas - this will limit possible negative effects on insects, amphibians and entrants, such as mortality or possible diseases. • Prohibit the use of pest control measures (rodenticides) to limit the population of rodents - it will cause unwanted mortality among rodents, but also re-poisoning of predatory mammals or birds. •
GIIP	• Minimize further soil/vegetation disturbance during construction. • Use only demarcated area for laydown and access (construction and operation) • Minimise use of trenches or other steep-walled excavations • Backfill open excavations as soon as possible after construction activity • Worker/contractor training/awareness, supervision regarding impacts to animals and protection of species • Prohibit poaching and interactions with fauna and flora in the worker code of conduct • Establishment, posting, and enforcement of vehicular speed limits, and other traffic management measures. • Implement good housekeeping measures for materials handling and waste management • Prepare decommissioning management plan (including management of biodiversity impacts) prior to decommissioning.
Operation and Maintenance	• Develop an operations-phase BMP, which will be informed by the pre-construction surveys, and identify measures to meet Natural Habitat NNL objectives. The operations-phase BMP will include a Habitat Restoration Program for the xeric grassland and associated priority biodiversity values which will, at the minimum, include (i) recommendations for restoration measures and opportunities to maintain biodiversity on-site and (ii) a clear demonstration of how NNL will be achieved, including any off-site conservation measures, notably for bats. The company will coordinate with relevant stakeholders in developing and implementing the operations-phase BMP and Habitat Restoration Program, including local experts and the Regional Inspectorate of Environment and Water (RIEW), responsible for managing the Natura 2000 Site. • Keep all movements to main asphalt roads Reduce maintenance work for vegetation around and beneath the panels (often used as a refuge by reptiles, amphibians, invertebrates).
Decommissioning	• The team of biodiversity experts should conduct a monitoring within one field season (January-December) before decommissioning the facilities. The team will be monitoring the area and determine the formed biocenoses and significant places for biodiversity, which will not be affected by the activities of removing the installations.

Type	Mitigation and management measures
	• The team of biodiversity experts should prepare a plan with measures to determine the specific activities for the restoration of the territory as it was before the realization of the PP installations. • Decommissioning activities must not affect neighbouring properties. • Will not be allowed the plantation of species included in the list of invasive and potentially invasive alien species of higher plants for Bulgaria, indicator SEBI10 - Invasive alien species for Europe (source EAES http://eea.government.bg/bg/soer /2010/biodiversitv-nem/biologichno-raznoobrazie-natsionalna-ekologichna-mrezha-1). •
Enhancement	•
Monitoring	Appoint consultant to devise a biodiversity monitoring program including the following: • Construction Monitoring should be carried out to reflect whether the proposed mitigation measures for the identified impacts are implemented in full and how they affect the expected positive or negative impacts on the elements of biological diversity, both within the PV territory and in the surrounding territories, including in the nearby protected area BG0000169 Ludogorie - Srebarna (SCI). • Post-commissioning monitoring should be carried out in the first year for an entire field season and include all priority biodiversity species established in the preliminary studies carried out in 2023, and pre-construction surveys, and a report on the monitoring should be submitted (as well as interim reports for the periods: January-February, March-June, July-August, September-December) and, if necessary, to propose new measures or make changes to the initially proposed ones. • Implement a Post-Construction Fatality Monitoring (PCFM) program to be developed by the international consultancy and implemented by the local consultancy. The program will take place for at least a two-year period with semi-annual reporting following a standardized template, but the actual timeframe of the PCFM program will depend on fatality results. • One year before decommissioning the facilities, a comprehensive monitoring of one field season should be implemented, with the aim of establishing the formed biocenoses and complexes, by drawing up a report with measures for a safe transition for biological diversity without allowing any impact and negative impact on biological diversity.

7.3. Residual impacts

The residual significance following the adoption of the mitigation measures outlined above is summarised in Table 44.

Table 44: Residual Impacts (biodiversity)

Impacts	Magnitude (pre mitigation)	Sensitivity	Magnitude (pre-mitigation)	Residual significance (post mitigation)
Construction -PV	High - Medium	High	Medium – Low	Moderate - Minor
Construction – OHTL	Medium	High	Low	Minor
Operation - PV	Medium	High	Negligible	Negligible
Operation - OHTL	Low	High	Negligible	Negligible

8. SOIL & GROUNDWATER IMPACT ASSESSMENT

8.1. Overview of impacts

The Project activities that may impact soils and groundwater include clearance of the vegetation cover, removal of topsoil, earthworks (excavation of soil), storage and use of fuels, maintenance of equipment, and waste generation (including unplanned wastewater releases). Regarding potential impacts, flat terrains have high stability and thus are typically less sensitive to erosion, compaction and pollution, where any likely impact can be localized and controlled.

The most likely adverse impacts on soil in the PV Site and OHTL route include:

- Degradation of soil quality due to excavation activities, improper disposal of spoil material, nutrient decline of soil quality and higher compaction, etc.;
- Degradation of soil quality due to potential contamination of soils and groundwater through such activities as unplanned effluent disposal (i.e., wastewaters) or through such processes as spillages and improper management of wastes;
- Soil erosion, especially in the absence of vegetation;
- Modification of hydrological regime impacting processes such as flooding and waterlogging;Soil mass movement could cause small landslides and blockages of the irrigation and drainage channels.

No offsite potential sources of contaminates of concern e.g. landfill sites, sewage works have been identified and are not considered further.

Impacts arising from historical contamination connected with the airfield infrastructure / operations e.g. oil spills, underground tanks (PV site only) are addressed in waste management section (section 10) and occupational health and safety management (section 17). In addition, a phase 1 environmental assessment (contamination) is planned prior to the start of construction.

The potential impacts from the Project on groundwater resources are as follows:

- Earthworks in the project area may increase erosion, especially during rainfall events, which may increase the suspended sediment concentrations and pollute water resources;
- Possible disruption of the irrigation and drainage patterns/network scheme due to earthworks for the OHTL;
- Degradation of groundwater quality as a result of accidental leaks/spills or siltation due to earthworks;
- Sewage will be generated from the construction workforce (toilets and washing facilities) and during the operation phase of the PV plant;
- Unplanned liquid effluents arising from washing equipment (i.e., PV solar panels)
- Inappropriate storage and management of waste material storage may lead to water quality impacts from run-off entering and improper drainage channels inside the PV plant site.

- The site facilities will ensure water availability for staff use (washing hands, toilets, etc.), filling water tanks with rotation trucks. Local companies will supply drinking water during the construction phase and therefore no groundwater will be required.
- For sanitary and construction water, the contractor will take it with tanks from the pipeline that crosses the PV Site under a permit.

8.2. Receptor Sensitivity

Table 45 summarises the key receptors relevant to the Project.

Table 45: Receptor Sensitivity - soil & groundwater

Receptors	Distance from the site	Sensitivity
Soil	Direct AOI	Medium
Agriculture land	OHTL ROW	
Groundwater resources	10 to 30 m depth	

8.3. Construction phase impacts

The construction of the PV Project and OHTL will include earthworks and site clearance (OHTO only), which will result in removing the vegetation and topsoil in the direct AOI and ROW. Foundations for the PV panels will be less than 10m and limited to the topsoil and upper loess layer with limited potential to impact groundwater directly. Cabling (LV and MV) is typically laid in trenches less than 1m in depth and, therefore, is unlikely to impact groundwater.

Impacts on soil are most likely to occur at the PV Site and locations of OHTL tower installation, where the soil structure may be disturbed during the clearance and excavation for the foundations and the backfilling leading to the potential for soil erosion. In addition, the construction of temporary access roads to the PV plant site and places of tower installation, assembly, and erection will require earthworks that may also impact soil structures. The baseline assessment indicates that the soil structure in the area has a thick topsoil (~2 meters).

Other related impacts on soil and groundwater may include accidental events (spills, leaks, and uncontrolled releases) due to the presence of hazardous materials, including fuel, brought onto the Site. In addition, storage and handling of hazardous and non-hazardous wastes within the site may pose risks for contamination of soil and groundwater, especially in improper waste management practices.

Large fuel storage facilities will probably not be necessary on-site and, therefore, would not be provided within any construction areas or contractor's compound. Where fuels are taken to the site in mobile units, this would be restricted to the minimum amount required to refill equipment on-site daily. Dedicated fuel tanker vehicles/ trucks will be used for this purpose. Vegetation clearance, earthworks and soil compaction may increase the intensity and volume of surface water run-off due to a decrease in water infiltration recharging the groundwater. Improper handling and

disposal of sewage, wastewater (addressed in section 9.0) and other solid wastes can eventually contaminate the groundwater resources in the area. The hydrogeology of the project area could potentially be affected if any leaked hydrocarbons permeate into the sub-surface and, through cracks in the bedrock geology, come into contact with the groundwater. Groundwater contamination during the construction phase may occur from unplanned events such as leaks and spills of oil, lubricants, fuel from heavy equipment, and improper handling of wastes and sewage.

Although vegetation removal, foundation works, and contamination incidents will be localised at the work site for the OHTL, based on the discussions mentioned above, impacts on soil and groundwater for the PV Site and the OHTL ROW are considered negative direct and indirect. However, the changes are considered temporary only during the construction phase, and the impact scale will be local. The overall magnitude of impacts arising from activities leading to the potential for increased soil erosion and contamination of soils and groundwater is considered medium before mitigation is shown in Table 46 below.

Table 46: Impact assessment - construction phase activities (soil & groundwater)

Construction activities, foundation excavations, use and storage of fuels and chemicals, alterations in the hydrological pattern/ scheme, improper management of wastes and wastewaters – construction phase					
Type	**Duration**	**Extent**	**Frequency**	**Likelihood**	**Magnitude**
Direct and Indirect	Short-term (temporary)	On-site	Daily / Temporary	Likely	Medium
Sensitivity					
Medium					
Overall Significance of Impact					
Moderate					

8.4. Operation phase impacts

During the operation phase, there are no anticipated impacts on soil and groundwater during normal activities. Potential impacts may be related to abnormal events, including accidental events (spills and uncontrolled releases) during operation or maintenance activities. There is a low likelihood that the storage and handling of hazardous and non-hazardous wastes within the site may pose risks for possible soil contamination, especially in cases of non-proper waste management practices; however, this is considered low likelihood. Oils / fuel spills from vehicles or machinery and chemicals/paints used for maintenance work on OHTL may occur, but these will be small, infrequent, reversible and very localised. The evaluation of the impact significance is summarised in Table 47:

Table 47: Impact assessment - operation phase ACTIVITIES (soil & groundwater))

Use and storage of fuels and chemicals, alterations in the hydrological pattern/ scheme, improper management of wastes – operation phase					
Type	**Duration**	**Extent**	**Frequency**	**Likelihood**	**Magnitude**
Direct	Long-term	On-site	Definitive	Likely	Low
Sensitivity					
Medium					
Overall Significance of Impact					
Minor					

8.5. Decommissioning phase impacts

Impacts on soils and geology during the decommissioning phase are considered less than during Project construction as, although there will be some ground disturbance; decommissioning aims to remove foundations, hardstanding and other Project infrastructure rather than areas of top- and sub-soil. All affected areas will be reinstated at the end of the decommissioning process. In conclusion, the overall impact significance after mitigation measures and management plans is**: Negligible.**

8.6. Cumulative impacts

Given the nature of the project and its location, it is estimated that there will not be a cumulative impact on soils or groundwater.

8.7. Mitigation and monitoring measures

The following mitigation and management measures are defined for the Project (OHTL and PV Project unless stated).

Table 48: Mitigation and monitoring measures (soil & groundwater)

Type	Mitigation and management measures
Design/Contract / Construction	• Adopt tension stringing technique to avoid impact on soils between the towers and stringing points. • Grade temporary access roads so their slope is not too large to avoid the build-up of fast-running run-off water during extreme precipitation events. • Minimise vegetation removal as much as possible to minimise soil erosion.
Project Specific	• Confine traffic movement to existing roads/tarmac areas within the PV Site. • Immediately restore the topsoil and vegetative cover using seeded restoration techniques for all already disturbed areas (where work is not planned) in the PV Site.

Type	Mitigation and management measures
	• Provide mitigation to minimise natural erosion and run off towards the north-west section of the site (towards the Natura 2000 site)
GIIP	• The top layer of fertile soil should be removed (where possible) during construction works and stored. Topsoil stripping is usually done by removing the upper layer of the soil up to 2m. • The topsoil will be stored and used to rehabilitate affected construction areas. The topsoil stockpiles' height should not exceed 2m. • Oil interceptors and silt traps shall be implemented to manage and retain sediments on site for surface water runoff. • Spill containment and clean-up kits will be available on-site, and clean-up from any spill shall be appropriately contained and disposed of at a bound landfill site. • Preparation of guidelines and procedures for immediate clean-up actions following any oil, fuel or chemical spillages. • Develop a site-specific Emergency Response Plan for soil clean-up and decontamination. • Implement a training program to familiarize staff with emergency procedures and practices related to contamination events. • Develop and implement a waste management plan (as part of the cESMS) to ensure that waste is disposed of correctly such that soil contamination is minimized. • Bund of areas where hazardous substances are stored (e.g., fuel, waste areas). • Fuel, oil, and used oil storage areas shall be contained in bunds of 110 per cent capacity of the stored material; • Refuelling shall be carried out in designated areas using strict protocols • Construction vehicles/pieces of machinery and equipment shall be serviced regularly at off-site locations; • Ensure that all construction plant and equipment are maintained in a good state of repair with minimal leaks; • Ensure storage areas have impermeable floors and containment of capacity to accommodate 110% of the volume of the largest waste container; • Rehabilitation and re-vegetation of cleared areas adjacent to the project development area. In addition, after completion of construction, all the temporary roads and embankments will be reinstated, lands will be re-cultivated, and the micro relief will be reproduced. • Any areas under the panels and around the panels will be returned to natural habitat. • Adequate sanitary facilities should be provided for the construction workforce. One mini toilet is recommended for every seven workers and not less than 1:15 workers. • Licensed companies shall be contracted to manage and dispose of wastes, wastewater and sludge from the septic tank.

Type	Mitigation and management measures
Operation and Maintenance	• Mitigation of impacts relating to soil contamination will be managed through the development of the Project ESMP for the operation phase, which will include provision for good working practices concerning the maintenance of vehicles and machinery, use, storage and handling of chemicals and management of wastes. A stormwater management plan shall be developed, and an internal drainage system shall be designed as part of the project design based on hydrological and flood studies to reduce the risk and mitigate the impact of potential floods.
Decommissioning	• The same measures as in the construction phase
Enhancement	• Not necessary.
Monitoring	• A three-year aftercare and monitoring program within the PV Site ensures soil and associated vegetation cover is returned to its original state where possible (using native plants). • One-year aftercare and monitoring program within the OHTL ROW.

8.8. Residual Impacts

The residual significance following the adoption of the mitigation measures outlined above is summarised in Table 49.

Table 49: Residual Impacts soil & groundwater

Impacts	Magnitude (pre mitigation)	Sensitivity	Magnitude (pre-mitigation)	Residual significance (post mitigation)
Construction	Medium	Medium	Moderate	Minor
Operation	Low	Medium	Minor	Negligible

8.9. Data limitations and uncertainty

There can be a high degree of uncertainty regarding decommissioning as engineering approaches and technologies evolve over the operational life of the Project.

9. WASTEWATER IMPACT ASSESSMENT[77]

9.1. Overview of impacts

During the construction phase, the proposed PV Project and OHTL will include work activities that generate wastewater, mainly from workforce sewage and contaminated construction surface water run-off. Improper wastewater management may lead to air, water, and soil pollution and odour nuisances in and around the project site. No planned discharges to surface water bodies are planned. Unplanned wastewater discharge at the PV site can lead to contamination of existing water resources (groundwater) and soils, and this is addressed in section 8.0.

9.2. Receptor sensitivity

Table 50 summarises the relevant receptors for unplanned wastewater discharges related to the Project (PV Site and OHTL unless noted).

Table 50: Receptor sensitivity (wastewater drainage, water quality)

Receptors	Distance from the site	Sensitivity
Local communities and houses within a direct AOI – visual and health	~10 m (at nearest point)	Medium
L-S Protected area (PV site only)	~30 m (at nearest point)	
Workforce - health	-	
Groundwater resources	10 to 30 m depth	
Soils	-	
Air through unpleasant smells	-	

9.3. Construction phase impacts

Potential sources of pollution during the construction period can be classified into *point sources* and *diffuse sources*. In the first category (point) can be included:

- domestic water collected on the site of the site organizations;
- meteoric waters fallen on the site organizations
- Meteoric waters drain gravitationally on the ground.

Diffuse *sources* of pollution can be considered:

- Intermediate warehouses of construction materials in bulk, which can be washed away by rainwater, possibly polluting the soil, subsoil and groundwater;
- the washing of construction site machinery and means of transport, which, if done in the organization of the construction site and not at stations specially set up for such operations, can produce water contaminated with petroleum-type substances, fuels and oils;
- accidental leaks of fuel, oils, chemicals or other dangerous materials due to malfunctions or improper handling;

[77] Potable and construction water supplies are expected to be from municipal water supply that is available at the site and is not considered to have impact on other users. Water resource use has been scoped out from further assessment (refer to Annex A – Scoping Table)

- volatile organic compounds (VOCs);
- material and fuel leaks resulting from accidents;
- accidental discharge of wastewater from various activities in the analysed area, from any toilets, washing machines, or water mixed with hydrocarbons, household waste, etc.;
- polluting substances resulting from accidental fires;
- construction activity
- accidental loss of fuels and oils from cars/vehicles and work equipment during the road transport of construction materials, causing their transfer to local water bodies or infiltration into groundwater;
- the activity of fuelling vehicles and work equipment as a potential source of surface and underground water pollution through accidents, faulty manoeuvres and emissions of volatile organic compounds;
- transport activity: atmospheric pollution with specific pollutants (NOx, CO, SOx, VOC, sedimentable powders, etc.) as a result of traffic specific to the construction period, as well as particles resulting from friction and ageing/wear of roads and tyres, can lead, as a result of washing by rains and the transfer to other environmental factors, to the pollution of surface water and underground water;
- water from precipitation that can carry polluting substances

Wastewater will be generated during construction as a result of on-site workforce activity. Wastewater generation can significantly impact the environment if no precautionary measures are taken to manage, collect, and treat it accordingly. The L-S Protected Area to the north of the PV Site is of particular sensitivity. Direct discharge into the environment would lead to direct impacts on agricultural lands, contamination of groundwater resources and contamination of surface waters (e.g. L-S protected area).

The road transport of construction materials can also result in the accidental loss of fuels and oils from cars/vehicles and work equipment, causing them to spill onto the ground and seep into the groundwater. In addition, the supply of vehicles and work equipment are potential sources of surface and underground water pollution.

The nature and severity of adverse effects associated with accidental spills are difficult to assess. Any pollution or deterioration of water quality is likely to have an associated impact on wildlife, the landscape (e.g. oil spills) or the local community (e.g., potentially hazardous substances). It is essential to mention that the execution works are temporary, so that the possible influences on the receptors can be considered short-term.

Table 51: Impact assessment - construction phase (wastewater drainage, water quality)

Construction activities – construction phase					
Type	**Duration**	**Extent**	**Frequency**	**Likelihood**	**Magnitude**
Direct	Short-term (Temporary)	On-site	Daily / Temporary	Possible	Medium
Sensitivity					

Medium
Overall Significance of Impact
Moderate

9.4. Operation phase impacts

During operation, the drainage system is proposed to ensure no potentially contaminated run-off can be routed to nearby existing surface water features or discharged to groundwater. Stormwater will be managed through a stormwater drainage system and management plan, and surface run-off may be discharged through sediment traps; in this case, erosion protection measures will be included as necessary. Foul water will be routed to an on-site septic tank. No direct discharges to surface water or groundwater features will occur during the operation phase.

One of the key activities during the operation phase is regularly cleaning PV modules to prevent dust build-up, which could affect their performance. It is planned that the PV modules will be cleaned monthly using dry cleaning techniques, with wet cleaning (using water) only planned once or twice per year aand also used only to clean the robots and cleaning equipment; otherwise, there will be a degradation in plant performance. The whole process is not expected to use additives that might alter the water quality. Nevertheless, in case of usage, it must be biodegradable with low environmental impact, contain no volatile organic compounds (VOCs) or phosphate and be chlorine-free. Runoff from site drainage will be routed into a wastewater drainage system containing storage for testing before disposal (on or offsite depending on quality). No other operational wastewater streams are expected. The sewerage water from the toilets will be gathered in a drainless draw tank and provided regularly to the municipal treatment plant.

Table 52: Impact assessment - operation phase (wastewater drainage, water quality)

Improper management of wastewater – operation phase					
Type	**Duration**	**Extent**	**Frequency**	**Likelihood**	**Magnitude**
Direct and indirect	Long-term	Local – within the site	Weekly / Monthly	Likely	Low
Sensitivity					
Medium					
Overall Significance of Impact					
Minor					

9.5. Decommissioning phase impacts

Considering the nature of the projects carried out, it is estimated that in the decommissioning stage, impacts on water will be the same as in the construction stage.

9.6. Cumulative impacts

No cumulative impacts are foreseen concerning wastewater effluents.

9.7. Mitigation and monitoring measures

Proper management of the site organization and the construction work itself will significantly reduce the possibility of generating adverse effects on the receptors in the vicinity of the works, which may lead to direct and indirect impacts on biodiversity and the health of the local community. The following mitigation and management measures are defined for the Project (OHTL and PV Project unless stated).

Table 53: Mitigation and monitoring measures (wastewater drainage, water quality)

Type	Mitigation measures
Design/Contract / Construction	• Prohibit groundwater for potable or construction-related purposes. • Ensure the drainage system includes a containment system for collecting intermittent contaminated wastewater streams, from abnormal operating scenarios or during wet cleaning of panels (maximum of 2 times per year). • Portable latrines or septic tanks are to be installed at least 250 m away from the site boundary (in particular, in the northwest of the site near the L-S Protected Area). • All cement will be delivered to the site pre-mixed or pre-cast from third parties with approved water use licences. • Confirm wastewater disposal/treatment facility for sanitary wastewater (mobile toilets/septic tanks) for construction phase.
Project Specific	• Undertake groundwork to ensure appropriate site drainage (avoiding contamination runoff risk). • Undertake due diligence of the WWTP in Silistra for alignment with GIIP • No storage or laydown areas within 250 m of the L-S Protected Area boundary or off-site residential receptors.
GIIP	The contractor will develop a Wastewater Management Plan in compliance with Bulgarian legislation, IFI Requirements and GIIP (Good international industry practice) that will also include measures to ensure: • The construction contractor must ensure that the temporary offices have adequate wastewater handling and disposal facilities. Their disposal must be made in close collaboration with the local government authorities (i.e., municipalities) and licensed companies. • Excavation must not occur in extreme weather conditions (rain, strong wind). • Prohibited to discharge of the resulting water during the construction period, on the ground, on the site or in the vicinity. • The removal of the oil products accidentally leaked from the machines in operation will be carried out using absorbent materials that will then be stored in specially arranged spaces and handed over to the authorized units for collection and/or disposal.

	• The handling of materials or other substances used in technologies will be carried out in such a way as to avoid their dissolution and entrainment by precipitation waters. • Equipment and means of transport will be periodically checked to avoid the possibility of accidental leaks due to their defects. • The storage of materials within the organization of the construction site must ensure the security of the warehouses and adequate and efficient handling, all this to avoid losses and accidental pollution. • Washing of means of transport and equipment will be done exclusively in areas specially arranged for such operations. • Avoidance of refuelling on site to prevent oil spills. If this is not possible, procedures will be developed to avoid accidental spillage, like providing drip trays and bunding for storing fuel and waste chemicals/ substances. In case of accidental leakage of petroleum products, absorbent substances will be applied immediately. • Responsible storage and disposal of liquid effluents such as sewage from temporary accommodation using certified disposal companies. • Intermediate warehouses of bulk construction materials, which can be washed away by rainwater and can pollute the soil, subsoil and underground water, must be stored in closed or covered spaces; the materials will be transported in conditions that limit the pollution of the atmosphere by sprinkling the material, covering it, using trucks with buckets/containers suitable for the type of material transported, etc. • The work schedule must prevent the overloading of the site with materials, as well as the too-long storage of material stocks on the site. • Technology for executing the project's objectives will be respected, taking measures to prevent and combat accidental pollution. • Comply with the environmental and execution conditions of the works imposed in the project for the execution of the works. • Good general housekeeping. • Conduct continuous training and education awareness of all project employees regarding waste management practices to avoid reducing the risks of waste generation and potential impact during the construction phase.
Operation and Maintenance	• General operational management requirements concerning good housekeeping during maintenance works and waste management and spill management provisions must be implemented. • Operational ESMS will include SPPP monitoring and management measures.
Decommissioning	• Same measures as in the construction phase
Enhancement	• Not necessary.
Monitoring	• Weekly inspections to ensure that SPPP measures have maintained the integrity and efficacy of the stormwater drainage system (more frequently during periods of bad weather).

	• Water quality monitoring at L-S Protected Area (before construction and quarterly during construction).

9.8. Residual significance

The residual significance following the adoption of the mitigation measures outlined above is summarised in Table 54.

Table 54: Residual significance (wastewater drainage, water quality and water use)

Impacts	Magnitude (pre mitigation)	Sensitivity	Magnitude (post mitigation)	Residual significance (post mitigation)
Negative – during construction	Medium	Medium	Low	Minor
Negative – during operation	Low	Medium	Negligible	Negligible

9.9. Data limitations and uncertainty

There can be a high degree of uncertainty regarding decommissioning as engineering approaches and technologies evolve over the operational life of the Project.

10. SOLID WASTE MANAGEMENT IMPACT ASSESSMENT

10.1. Overview of impacts

During its life cycle, the proposed PV solar plant and OHTL will include numerous work activities such as site clearance, removal of vegetation, excavation works, setting up of labour and staff working facilities (temporary offices), installation and removal of modules/panels and temporary structures that will generate different types and amounts of wastes (solid and liquid wastes). The most significant quantities of waste are expected to be non-hazardous; however, particular hazardous wastes may be generated in small quantities. Typically, the following types of waste will be generated due to the development of the project:

- Excavated soil material (spoil/surplus material) due to earthworks and construction activities;
- Municipal and domestic solid waste from the workforce;
- Waste oil from the generator and other construction machinery;
- Packaging waste such as gunny bags, plastics, paper/cardboard, etc.;
- Empty paint containers, metal scrap, paints, varnishes, adhesives, anti-corrosive substances, etc.;
- Construction debris.

The potential waste streams that may be generated during the project phases are summarised in Table 55.

Table 55: Potential Waste Streams and Classification Codes for the proposed project

List of wastes Type of wastes[78]	Code of wastes (EU)	Construction Phase (CO)	Operation Phase (OP)	Decommissioning Phase (DEC)	Quantities in Phase (ton/MW) CO	 OP
Paper and cardboard packaging	15 01 01	Yes			4.52	
Plastic packaging	15 01 02	Yes			0.03	0.004
Wooden packaging	15 01 03	Yes			0.18	
Metallic packaging	15 01 04	Yes				0.029
Mixed packaging	15 01 06	Yes				
Glass packaging	15 01 07	Yes				
Absorbents, filter materials, wiping cloths and protective clothing other than those mentioned in 15 02 02	15 02 03	Yes				
Discarded equipment other than those mentioned in 16 02 09 to 16 02 13	16 02 14	Yes			0.23	0.023

[78] chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://assets.publishing.service.gov.uk/media/6152d0b78fa8f5610b9c222b/Waste_classification_technical_guidance_WM3.pdf

List of wastes Type of wastes[78]	Code of wastes (EU)	Construction Phase (CO)	Operation Phase (OP)	Decommissioning Phase (DEC)	Quantities in Phase (ton/MW) CO	 OP
Wastes not otherwise specified	16 07 99	Yes				
Concrete	17 01 01	Yes (future and historical)		Yes	1.45	
Wood - untreated	17 02 01	Yes			1.97	
Plastic - excludes packaging waste	17 02 03	Yes			0.2	
Iron and steel	17 04 05	Yes (future and historical)		Yes	0.72	
Mixed metals	17 04 07	Yes		Yes		
Cables other than those mentioned in 17 04 10	17 04 11	Yes (future and historical)	Yes	Yes	0.06	
Soil and stones other than those mentioned in 17 05 03 (Surplus natural material)	17 05 04	Yes (future and historical)			1.4	0.004
Mixed construction and demolition waste other than those mentioned in 17 09 01, 17 09 02 and 17 09 03	17 09 04	Yes (future and historical)		Yes		
Paper and cardboard	20 01 01	Yes				
Glass	20 01 02	Yes				
Biodegradable kitchen and canteen waste (organic wastes, i.e., food wastes)	20 01 08	Yes				
Cloths	20 01 10	Yes				
Paint, inks, adhesives, and resins other than those mentioned in 20 01 27	20 01 28	Yes				
Discarded electrical and electronic equipment other than those mentioned in 20 01 21, 20 01 23 and 20 01 35	20 01 36	Yes	Yes	Yes		
Wood other than that mentioned in 20 01 37	20 01 38	Yes				
Plastics	20 01 39	Yes		Yes		
Metals	20 01 40	Yes		Yes		0.089
Other fractions not otherwise specified	20 01 99	Yes				
Biodegradable waste	20 02 01	Yes			0.26	
Mixed municipal waste	20 03 01	Yes	Yes	Yes		
Packaging containing residues of or Contaminated by dangerous substances	15 01 10*	Yes				

List of wastes Type of wastes[78]	Code of wastes (EU)	Construction Phase (CO)	Operation Phase (OP)	Decommissioning Phase (DEC)	Quantities in Phase (ton/MW) CO	 OP
Absorbents, filter materials (including oil filters not otherwise specified), wiping cloths, protective clothing contaminated by hazardous substances	15 02 02*	Yes				
Oil filters	16 01 07*	Yes				
Wastes containing oil	16 07 08*	Yes				
Wastes containing other dangerous substances	16 07 09*	Yes				
Soil and stones containing dangerous substances	17 05 03*	Yes				
Solvents	20 01 13*	Yes				
Paint, inks, adhesives and resins containing dangerous substances	20 01 27*	Yes				
Electrical and electronic equipment other than those mentioned in 20 01 21 and 20 01 23 containing hazardous components	20 01 35*			Yes		

In addition to future Project related wastes, site clearance activities conducted to date by the former owner have resulted in disposal of demolition waste (including concrete, biomass waste and other wastes) on two land plots adjacent to the Project site and the village of P. Lambrinovo.

Figure 87: Temporary waste disposal locations (shown in orange)

This demolition waste may also include asbestos containing materials (ACMs) which must be tested and if confirmed as presence, disposed in accordance with approved practices for asbestos handling and disposal that include performing a risk assessment of the potential for ACMs prior to secondary removal and disposal at an approved asbestos landfill. If ACMs are identified the Project will route the demolition waste to a landfill that is authorised to accept ACM materials and employ a specialist contractor licensed to handle ACMs. If no ACMs are identified, the demolition waste on the plot adjacent to the project site will be left in situ or resused on the project site. The plot adjacent to the community of P. Lambrinovo will be removed to an authorised location or re-used on site.

The Project will be responsible for planning for properly disposing of this demolition waste in accordance with national regulations and international standards and it is therefore included in the scope of the impact assessment.

Figure 88: Waste from the site clearance works was observed on land adjacent to the project site (RSK)

10.2. Receptor Sensitivity

The availability of suitable waste facilities in the indirect AOI (Silistra District) for transportation and disposal of general waste is reasonable based on baseline data. However, options for disposal of hazardous waste following GIIP may be less readily availableAlthough waste management is regulated in Bulgaria following GIIP principles (e.g. duty of care), actual implementation following GIIP is not guaranteed and therefore, the availability of "GIIP" waste management services may be constrained and therefore it is assigned a medium sensitivity in all cases except in relation to disposal of PV panels. Recycling PV panels in Bulgaria and Europe is possible at this time, particularly at high volumes. It is assumed for this ESIA that the availability of options for PV panel recycling can be adopted and a low sensitivity is applied for this waste stream.

Table 56: Receptor Sensitivity (solid wastes management)

Receptors	Distance from the site	Sensitivity
Local communities and houses within and/or near the project area	~10m from direct AOI	Medium
Workforce - health	Direct AOI	
L-S Protected Area	~ 30 m from the PV site boundary	
Waste infrastructure (availability of disposal and transportation facilities for general and hazardous waste)	The availability of suitable in the country for transportation and disposal of waste is generally good but my not be fully aligned with GIIP. Options for hazardous waste and PV Panel recycling are known to be available regionally.	
Panel disposal infrastructure (recycling facilities)	The avilaibty of recycling options within Bulgaria is possible and is expected to be used.	Low

10.3. Construction phase impacts

10.3.1. General wastes

During this phase, the primary source of waste will be the construction activities themselves, waste from equipment and material packaging, and waste generated by the workforce. Some quantities of waste will be generated from earth and concrete works, electro-mechanical works, PV module installation, tower and cable installation, etc. However, as a significant element of the PV solar plant and OHTL construction comprises the assembly of prefabricated structures, the amount of construction waste will not be significant.

Routine maintenance of construction machinery and vehicles will not be conducted within the construction areas; therefore, the creation of associated wastes (used tyres, batteries, oils, etc., from vehicles) is not expected in high volume. However, there may be a need for emergency repairs on-site; therefore, these waste streams may arise and should be considered in the waste management planning.

The largest volume of waste expected during the construction phase will be excavated soils (spoil/ surplus material) from the earthworks and construction activities needed to install the PV solar modules, laying underground cables, OHTL towers foundations, etc. Potential impacts may result in the Contractor improperly managing these wastes (naturally excavated soils). This includes depositing excess/surplus material in areas not approved by government institutions/authorities and in non-compliance with the existing national legislation. The deposition of these soils directly in areas covered with vegetation would directly impact the area's biodiversity (flora and fauna). Moreover, the deposition of excess/surplus material in the vicinity of water bodies/water resources (such as L-S Protected area) would represent a permanent risk of contamination of these waters and damage to water ecology due to the increased organic matter and turbidity in water, in particular during rainfall periods. It is anticipated that all excavated material will remain on site,

being used in backfilling trenches or for layering on internal routes and pathways, with any excess material used for internal landscaping.

For the OHTL works, it can be anticipated that the vegetation clearance will generate small amounts of organic waste, typically composed of agricultural biomass and scrub. Full clearance along the OHTL ROW is not required as the land is classed as agricultural and therefore does not have tress or other tall vegetation in the ROW. Furthermore, any clearance that is required will be confined to the tower footprint location.

General urban waste may include various non-hazardous materials, including wood, paper, cardboard, and plastics. In addition, domestic waste, similar to household wastes, will be generated by workforce activity during construction work in the project areas, including food residues (organic wastes), paper, bottles and cans and other packaging materials. These residues/wastes shall be collected on-site and further handled, deposited or recycled.

The OHTL will generate small quantities of excavated soils to install towers. Instead of depositing these natural soil quantities in disposal areas, they could be preserved in temporary disposal close to the PV solar plant and (partially) reused in the backfilling process and reused for rehabilitation at the end of construction works. This approach minimizes the risks from surplus/spoil material and adequately fits the purpose and objectives of a good waste management practice as required by national legislation and international best practices.

Several impacts may arise as a result of improper general waste management. There may be soil contamination in the event of illegal waste dumping (by third party waste transportation companies) inside and outside the project area. Besides contamination of environmental elements, these potential impacts can also create unpleasant odours (such as organic wastes). Moreover, improper waste management will result in an unsafe environment for the workforce and the local community in the area, which, as a result, may pose risks for human health-related issues. Another essential aspect would be the indirect impact of additional costs that will be needed by the relevant authorities (i.e., municipalities) for handling, cleaning, collecting and transporting these wastes from the illegal dumping areas to the approved disposal/ landfill sites.

10.3.2. Hazardous wastes

Hazardous wastes can be generated during the construction activities for the PV Project. This may result due to different substances/materials on-site, such as paints, solvents, fuel, oil, additives, etc., which may have to be used during the various work activities. Among the types of hazardous waste that might be generated are excess concrete quantities (with additives), various paints, solvents and contaminated containers (e.g., used containers of paints, solvents and additives). Compared with urban/municipal wastes, hazardous wastes pose higher environmental and human-related health risks, particularly if handled, collected and deposited improperly. The effects of hazardous waste are immediate and can cause massive contamination, especially if it comes in contact with agricultural lands or, even worse, in contact with water bodies (e.g. L-S Protected Area), which, due to free flow may have a direct impact on biodiversity (flora and fauna) and

indirect pollution of other habitats in the downstream (water bodies or ground surface). The proposed Project will generate limited amounts of hazardous waste during construction. The scale of the potential impacts before mitigation and the impact significance of waste-related risks during the construction phase of the project can be summarized as follows.

Table 57: Impact assessment - construction phase (solid wastes management)

Construction activities – construction phase					
Type	**Duration**	**Extent**	**Frequency**	**Likelihood**	**Magnitude**
Direct	Short-term	On-site	Daily / Temporary	Likely	Medium
Sensitivity					
Medium					
Overall Significance of Impact					
Moderate					

10.4. Operation phase impacts

During its operation, the PV solar plant and OHTL will create minimal waste from general staff and maintenance activities. Common types of waste that will be created in the project's operational phase may include electrical waste (consumables, spare parts and obsolete equipment and broken/ damaged solar panels), as well as packaging waste and waste paint from coating towers. These items will be removed outside the project area for disposal or recycling offsite. Considering the limited distribution of impact (within the site), long duration of activities and low magnitude and intensity, the significance of impacts from wastes before mitigation is assessed as Minor.

Table 58: Impact assessment - operation phase (solid wastes management)

Improper management of wastes – operation phase					
Type	**Duration**	**Extent**	**Frequency**	**Likelihood**	**Magnitude**
Direct and indirect	Long-term	Local – within the site	Temporary	Probably	Low
Sensitivity					
Medium					
Overall Significance of Impact					
Minor					

10.5. Decommissioning phase impacts

Impacts from waste generation during the decommissioning phase are considered to be less significant than those during Project construction. This phase will include the dismantling and removal of all project structures and facilities. As a consequence, potential amounts of wastes may be generated during this process. The most common types of waste that will be created in the decommissioning phase of the project may include domestic wastes, packaging wastes, electrical waste and solar panels. Solar panels/modules will be removed and transferred to another location such as the European Recycling Centre (ERC) or sent to the manufacturer for recycling. At the end of the phase, all these wastes and items will be removed outside of the project area. As a result of the discussions above, the significance of impacts is rated Minor.

10.6. Cumulative impacts

No cumulative impacts are foreseen concerning waste generation.

10.7. Mitigation and monitoring measures

The following mitigation and management measures are defined for the Project (OHTL and PV Project unless stated).

Table 59: Mitigation and monitoring measures (solid waste management)

Type	Mitigation and management measures
Design/Contract / Construction	• Project contracts obligate the Project PV panel suppliers to remove panels for recycling or send them to the supplier (the exact approach to be agreed with the finally selected panel supplier). • Confirm availability of PV panel recycling options and availability for use by the project (to be confirmed based on supplier approach) • Identify recycling options for waste, such as any electric waste, broken PV panels/modules, packaging waste, etc., through authorized/ licensed waste management companies. • Ensure selected PV modules include all costs for returning and decommissioning PV panels (intermittently during operation and end of life). • Prohibit the following materials in the EPC Contract / Procurement Policy o Asbestos o PCB containing materials o lead-based paints o pesticide, herbicides as defined under the Stockholm Convention
Project Specific	• Confirm composition of demolition waste (absence of asbestos containing materials) disposed adjacent to the project site and prepare a disposal plan for safe removal to an approved location or for safe re-use. • Develop a construction site Waste Management Plan (as part of the cESMS)

Type	Mitigation and management measures
	• Require Contractor to conduct a duty of care audit for proposed general waste, construction waste, hazardous waste and recycling facilities in the municipality and region to confirm compliance with GIIP for acceptance by the Project Company. • Provide contracts with waste transfer and disposal companies for all waste streams. • Contractor to ensure all subcontractors use approved waste disposal routes only following the outcomes of the waste due diligence audits. • Site all temporary onsite waste storage areas at least 200 from the L-S Protected area
GIIP	The Contractor will develop a Waste Management Plan in compliance with Bulgarian legislation, IFI Requirements and GIIP that will also include measures to ensure: • Offices have adequate waste handling and disposal facilities. Arrangements for collecting non-hazardous and hazardous wastes must include on-site waste bin equipment provisions. Waste bins are recommended to be segregated according to the waste stream, e.g., organic, hazardous, paper/cardboard, plastic, and metallic waste. Their disposal and recycling must be made in close collaboration with the local government authorities (i.e., municipalities) and licensed waste recycling companies. Provision of chemical/ mini toilets for workers at the base camp must be in the ratio of 1:7 and maximum of 1:15 (toilet to workers), respectively, to maintain hygienic and clean surroundings. • Segregation, reuse and, where feasible, recycling of wastes by registered operator; construction contractor must follow the 3R policy to manage the solid wastes • Waste storage/collection areas shall be fenced, laid at the bottom with an impermeable cover and equipped with relevant signage (e.g., urban waste collection area); any waste fuels/oils or chemicals that may need to be temporarily stored on site will be contained within solid impermeable bunding with 110% capacity of storage containers, to avoid contamination of soils, surface and groundwater in the event of spillage/leakage. • Avoidance of refuelling on site to prevent oil spills. If this is not possible, procedures will be developed to avoid accidental spillage, like providing drip trays and bunding for storing fuel and waste chemicals/ substances. • Good general housekeeping. • Covering of solid waste containers to prevent windblown litter across and outside site. • Composting of organic wastes. • Appropriate handling and storage of hazardous and non-hazardous waste for licensed collection for responsible disposal by registered operator; In each case, the entity/company that will transport or transfer the waste shall be equipped with a proper license , according to national laws.

Type	Mitigation and management measures
	• Generated waste quantities - must be recorded in a separate/dedicated register according to the type of waste and the quantities generated. During the waste transfer process, a waste transfer format (Waste Transfer Format) shall be filled out to determine the respective quantities according to the type of waste leaving the site and the name of the company/entity that will handle these wastes. These data shall be regularly kept by the Contractor during the construction activity, and presented/reported to the government authorities if required; • Conduct continuous training and education awareness of all employees of the project in regard to waste management practices in order to avoid, reduce the risks of waste generation and potential impact during the construction phase.
Operation and Maintenance	The O&M contractor will develop a Waste Management Plan in compliance with Bulgarian legislation and GIIP that will also include measures to ensure: • Food/organic waste and recyclables, such as paper, plastic, scrap metal waste, etc. must be appropriately segregated and stored in designated waste bins/containers and periodically deposited in approved disposal areas or sold to licensed recycling companies. • Ensure electrical waste (consumables, spare parts and obsolete equipment) and broken solar panels are adequately packed and sent back to the manufacturer or reused in other forms and locations; • Generated waste quantities - must be recorded in a separate/dedicated register according to the type of waste and the quantities generated. During the waste transfer process, a waste transfer format (Waste Transfer Format) shall be filled out to determine the respective quantities according to the type of waste leaving the site and the name of the company/entity that will handle these wastes. The Developer shall regularly keep waste data during the operation activity and present/report to the government authorities if required. • Conduct continuous training and education awareness of all project employees regarding waste management practices to avoid and reduce the risks of waste generation and potential impact during the operation phase.
Decommissioning	• Develop a decommissioning waste management plan • Recycle PV and battery waste streams (buyback / take back scheme)
Enhancement	• Not necessary.
Monitoring	• Weekly and monthly waste generation volumes for construction wastes (segregated by waste stream) to the Project Company • During construction and decommissioning, the Builder will ensure the monitoring of waste management, which he will report to the Environmental Protection Agency. • During the operation of the investment, the Developer will ensure the monitoring of waste management, which it will report to the Environmental Protection Agency.

10.8. Residual Impacts

The residual significance post-mitigation is summarised in Table 60.

Table 60: Residual Impacts (solid wastes management)

Impacts	Magnitude (pre mitigation)	Sensitivity	Magnitude (post mitigation)	Residual significance (post mitigation)
Negative – during construction	Medium	Medium	Low	Minor
Negative – during operation	Low	Medium	Low	Negligible

10.9. Data limitations and uncertainty

There can be a high degree of uncertainty regarding decommissioning as engineering approaches and technologies evolve over the operational life of the Project.

11. ARCHAEOLOGY AND CULTURAL HERITAGE IMPACT ASSESSMENT

11.1. Overview

No UNESCO World Heritage Sites are within the direct or indirect AOI (5km). Confirmation from the Agency of Cultural Heritage that no items registered under state protection are located in the Project area or within a 500-meter radius has also been received.

11.2. Receptor Sensitivity

Table 61 summarises the relevant archaeological receptors in the direct AOI relevant to the Project.

Table 61: Receptor Sensitivity (archaeology and cultural heritage)

Receptors	Distance from the site	Sensitivity
Unidentified cultural heritage in the Project footprint (PV and OHTL)	This is only possible during excavations, which will only occur during construction. Based on current findings, the significance of these findings is expected to be low.	Low
Known cultural heritage in the Project footprint (PV and OHTL)	No traces have been found.	

11.3. Construction phase impacts

Unexpected cultural heritage items may be identified during site preparation, excavation, or other earthworks. Site preparation and excavation work is only expected during the construction phase and will take place in the construction of office buildings, for the erection of the PV panels, for the erection of the OHTL towers and the digging of trenches for cables and drainage etc. Given Bulgarian history, there is a possibility that items of archaeological interest not previously identified (referred to as "chance finds") may be identified during the excavation works. However, given the modified nature of the direct AOI and the relatively shallow below-groundwork, it is not expected that the impact will be high, as summarised in Table 62.

Table 62: Impact assessment - construction phase (cultural heritage)

Cultural heritage – construction phase					
Type	**Duration**	**Extent**	**Frequency**	**Likelihood**	**Magnitude**
Direct	Short-term / Temporary	Local	Permanent	Unlikely	Low
Sensitivity					
Low					
Overall Significance of Impact					
Negligible					

11.4. Operation phase impacts

Operational impacts have been scoped out.

11.5. Decommissioning phase impacts

Decommissioning impacts have been scoped out as no new below ground excavation works is expected in areas that were not previously impacted during construction.

11.6. Cumulative impacts

No cumulative impacts are expected in relation to cultural heritage.

11.7. Mitigation and monitoring measures

Table 63 defines the mitigation and management measures for the Project (OHTL and PV Project unless stated).

Table 63: Cultural heritage mitigation and management

Type	Mitigation and management measures
Design/Contract	• Include the requirement for the Contractor to develop a chance finds procedure in the Project contract.
Project Specific	• Project Company to confirm no feature of archaeological interest are known through formal communication with the National Institute of Archaeology under the Academy of Sciences of Bulgaria
GIIP	• Establish a chance-find procedure (including national and lender requirements and following GIIP) for the construction phase or any phase that requires excavation work. • Should items of cultural heritage be identified, they should be managed in line with the chance find procedure and the requirements of the. • Notify the National Institute of Archaeology under the Academy of Sciences of Bulgaria should be notified.
Operation and Maintenance	• Not relevant
Decommissioning	• Not relevant
Enhancement	• Train excavation workers in chance find procedure during the induction.
Monitoring	• Log and report all chance finds identified. • Monitor items of cultural heritage if found on or near the Project site.

11.8. Residual Impacts

The residual significance post-mitigation is summarised in Table 64.

Table 64: Residual Impacts (archaeology and cultural heritage)

Impacts	Magnitude (pre mitigation)	Sensitivity	Magnitude (post mitigation)	Residual significance (post mitigation)
Negative – during construction	Low	Low	Negligible	Negligible

11.9. Data limitations and uncertainty

No archaeological field study has been undertaken to confirm the absence of below ground archaeological or cultural features at the site.

12. AIR QUALITY IMPACT ASSESSMENT

12.1. Overview

Impacts on local air quality as a result of Project activities will likely occur during the construction and decommissioning phases. Airborne pollutants from construction and decommissioning will primarily include particulate matter, and nitrogen dioxide (NO_2).

Sources of impacts from the construction and decommissioning of the Project will include the following:

- Temporary dust emissions from earthworks, vegetation clearance, soil excavations, vehicle movement causing entrainment, stockpiles, and unpaved surfaces near the Project area. This also includes construction of the transmission line towers and potential upgrades of access roads or construction of new roads;
- Temporary emissions of exhaust gases into the atmosphere from vehicles involved in Project construction (i.e., emissions from excavators, bulldozers, trucks, vehicles/ cars);
- Temporary exhaust emissions from plant and equipment use such as generators and compressors during work activities.
- PM_{10} and $PM_{2.5}$[79], which may be sourced directly from construction activities or from vehicle and plant exhaust emissions.

During the operational phase of the Project emissions to atmosphere will mainly be from vehicles attending the site for maintenance purposes and will be minimal. There are no direct emissions from the operation of solar photo voltaic panels.

12.2. Receptor Sensitivity

The US EPA reveals *"that precipitation of greater than >0.2mm/hr will affectively attenuate dust and wind speeds of more than >5.3m/s are typically required to lift dust from open surfaces. This will be lower for dust generated by mechanical means (i.e., during excavation and due to the movement of vehicles over unpaved surfaces), at around 3m/s".* Based on this statement, the US EPA concludes that:

- During the most extreme wind events and speeds, dust will typically travel a maximum of 200m from the source before falling from the air column;
- At the highest wind speeds, dust is unlikely to travel more than 500m from the source; and,
- Precipitation of >0.2mm/h is likely to effectively weaken dust emissions.

For this ESIA, the direct AOI for potential AQ impacts identified for the construction works is defined as 500m from the boundary of the Project site, transmission line ROW and roads used for delivery of materials and personnel to the site. Potential receptors in the study area consist mainly of the residential population living near the proposed site of the PV Solar plant, L-S Protected Area and workers along the OHTL routes as detailed in Table 65.

[79] PM_{10} is airborne particulate matter with an aerodynamic diameter less than 10 microns (µm); $PM_{2.5}$ is airborne particulate matter with an aerodynamic diameter less than 2.5µm.

Table 65: Receptor Sensitivity (air quality)

Receptors	Distance from the site	Sensitivity
Workers (at the Site and along the OHTL)	Within 250 m of the works	Medium
Residential population living near the proposed site of the PV Project/ agricultural workers and crops	~10m from the PV boundary up to 500m from the PV boundary[80]	
L-S Protected Area	~30m from the PV boundary (to 50m)	

Figure 89 illustrates the AoI around the PV power plant site which indicates that in a worst-case scenario, residents of most of P. Lambrinovo have the potential to be impacted by construction and decommissioning related emissions, particularly construction (and decommissioning) dust. However, given the relatively minor excavations needed for solar PV panel installations the risk of dust impacting beyond 250 metres is considered to be negligeable.

Figure 89. Construction and decommissioning Air quality AoI

Google Earth Pro.

Construction of the OHL has potential to generate dust. The routes pass through agricultural fields with no sensitive human or ecological receptors likely to be adversely impacted. Impacts on the agricultural land are likely to be negligeable.

[80] 500m is used as a worst-case scenario to align with the AOI defined in the baseline section.

12.3. Construction and decommissioning phase impacts

Activities with the potential to raise air emissions during this phase will be associated with vehicle movements (transport of materials and equipment), earthworks and the potential use of generators for work activities. The principal emissions in the air during construction are related to dust generation. Dust comprises large airborne particles of material, which are resident in the atmosphere for short periods after release, as they are heavy enough to fall out of suspension in the air relatively quickly.

The effects of these emissions will be localised, and they do not pose long-term or widespread changes to local air quality, but they may be a source of nuisance and complaints from communities if located close to inhabited areas and properties and have the potential to encroach into the L-S Protected Area. This is particularly important in the summer period, close to working sites and across sections of roads in poor condition or unpaved. The precise behaviour of the dust movement, its concentration in the atmosphere, and the distance it may reach depends upon several factors, including wind direction and strength, rainfall, local topography and the presence of screening structures (buildings, trees etc.) that may intercept dust before it reaches sensitive locations. The climate data in the ESIA shows the prevailing wind coming from either the SW or NE with a NE wind being experienced approximately 17% of the time. This is relevant for the properties of P. Lambrinovo who are adjacent to the SW edge of the site and would be impacted by dust and noise from the project.

The other potential source of air pollution arises from exhaust emissions associated with road traffic, vehicular movement, and operation of plant and machinery; the principal pollutants of concern are NOx, PM_{10} and $PM_{2.5}$. Exhaust emissions from vehicles and machinery will be reasonably limited in quantity and duration and are not considered to add significantly to existing baseline levels. For static sources, potential impacts caused by diesel combustion engine emissions will vary in intensity according to the distance of potential receptors (human receptors) from the source. Higher traffic levels are anticipated to occur between April and September, which will most likely be the peak months for construction activities. As a result, potential impacts on air quality are predicted due to increased traffic and disturbance effects on local communities.

Table 66: Impact assessment - construction phase (air quality)

Preparation works, excavation and traffic movements – construction phase					
Type	**Duration**	**Extent**	**Frequency**	**Likelihood**	**Magnitude**
Direct	Temporary	Local	Daily / Temporary	Possible	Medium
Sensitivity					
Medium					
Overall Significance of Impact					

Moderate

12.4. Operation phase impacts

Operational phase air quality impacts are scoped out for further assessment in the ESIA; refer to section 12.1 above and Annex I of this ESIA (scoping table).

12.5. Cumulative impacts

No cumulative impacts on air quality as a result of construction activities or during the operation and decommissioning phases associated with the Project are anticipated as there are no known large-scale developments in the AoI during construction of this Project.

12.6. Mitigation management and monitoring measures

12.6.1. Dust impact risk assessment.

During construction and decommissioning phases of the project it is required that all activities undergo a dust risk assessment to identify potential for dust impacts on nearby sensitive receptors (residential, schools, clinics etc). As an example, excavation activities including for foundations of solar panel arrays, temporary construction roads, or permanent works to improve existing public or site roads are likely to have a high risk of generating dust with potential impacts on nearby sensitive receptors, whilst mounting solar panels on frames and electrical connection works will have a low risk of generating dust. Table 67 provides an example of a dust risk assessment which can be adopted by the Contractor for this Project.

Records must be kept of dust risk assessments for all activities, even where no risks exist, so that evidence can be provided during audits to show that appropriate measures are being taken to assess dust raising risks and manage potential adverse impacts.

When an activity is identified as having a significant (medium or high) risk of generating dust, with potential for dust to be carried beyond the site boundaries and cause adverse impacts on sensitive receptors, appropriate measures shall be applied to remove or minimise adverse impacts. Appropriate mitigation and management measures are identified in Table 68. The measures will include suitable monitoring by ongoing observation and vigilance throughout the identified activities (i.e., not limited to daily observations) to ensure that mitigation measures are applied promptly and effectively to eliminate or minimise impacts.

Table 67: Dust generation risk assessment

Stage	Description	Potential dust raising activities	Distance to nearest sensitive receptor	Dust raising potential/ magnitude
Site preparation (main site, OHLT and access road(s))	Site survey work. Vegetation clearance Access road construction Construction of storage and work areas Acquisition of borrow-pit material	Excavation works Transport of materials	<250m 250m-500m >500m	High - Major High - Minor High - Negligible
Site enabling works (main site, OHTL and access road)	Installation of new roads as required New civil infrastructure, potentially including piling for new foundations Site drainage works Shallow foundations for electrical plant and security fencing Movement around site Road consolidation	Excavation works Transport of materials Resuspension of dust on unsurfaced roads.	<250m 250m-500m >500m	High – Major High - Minor High - Negligible
Plant installation	Movement of equipment around site Mounting of solar PV panels to the pre-constructed concrete foundations/frameworks Transmission towers erection	Transport of materials Wind Resuspension of dust on unsurfaced roads	<250m 250m-500m >500m	Low - Minor
Electrical and control	Installation of electrical cables, equipment, etc. Conductor stringing	Transport of materials Resuspension of dust on unsurfaced roads	<250m 250m-500m >500m	Low - Minor
Commissioning	Testing of control systems and software with no additional activities required	Resuspension of dust on unsurfaced roads.	<250m 250m-500m >500m	Low - Minor

12.6.2. Mitigation and management measures

The mitigation and management measures detailed in Table 68 are defined for the Project (OHTL and PV arrays unless stated).

Table 68: Mitigation and monitoring measures (air quality)

Type	Mitigation and management measures
Design/contract / construction	• Maintain a Project mandatory 500m buffer zone between temporary construction compounds (laydown, waste, parking area, stockpiles) and the L-S Protected Area.
Project specific	• Construct new road sections following site clearance and stockpile management requirements, including ensuring any stockpiles are covered or have their surface stabilised to minimise dust events. • Excavation, handling and transport of erodible materials shall be avoided under high wind conditions where practicable. • Use water (from a sustainable source) or other control measures such as chemical bonding agents or aggregate to control dust (bonding agents must be carefully selected to not have potential to contaminate the environment). • Demarcate delivery roads and access tracks at site and ensure all workers stick to demarcated areas. • Unpaved internal roadways to have a 15km/h speed limit which is advised to drivers during site induction and is monitored (inexpensive hand-held devices are readily available) with penalties imposed for non-adherence • No placnt or equipment to be stored less than 500m from the L-S Protected Area • No onsite cement batching (main site and TL) is envisaged. Existing concrete batching plants in the local area (Silistra) for cement production or use pre-cast concrete blocks. If this requirement shall change, the Contractor must undertake an assessment of E&S risks connected with the concrete batching option.
GIIP	Mitigation of impacts in relation to generation of dust and vehicle / machinery emissions will be managed through the development of the ESMP/CEMP and CTMP for the construction phase which will specify appropriate measures for the management of dust and fugitive emissions: • Construction Traffic Management Plan (CTMP) to incorporate all relevant mitigation measures for vehicle movement nearby and within the project areas • Minimise open excavation areas • Minimise stockpiling of soil and earthen material through coordination of earthworks and excavation activities (excavation, grading, compacting, etc.) • Materials will be transported in conditions that ensure this by sprinkling the material, covering it, using trucks with buckets/containers suitable for the type of material transported, etc. • Friable construction materials will be handled in such a way as to reduce the level of particles that atmospheric currents can carry to a minimum. • Loading/unloading of trucks carrying dust generating materials during periods of strong wind, will be avoided.

Type	Mitigation and management measures
	• Implement dust suppression techniques, such as applying water to dusty areas (e.g., site, access road, etc.) using water spraying tanks • Minimise vegetation clearance, whenever practicable, to reduce exposure of bare soil, and revegetate cleared areas as soon as possible • For stockpiles which will be left for long periods, apply grass seed or other covers • Burning of any material anywhere on construction sites is banned • Restrict vehicle speeds on construction sites (15 km/h for unpaved site roads and 20km/h for paved site road and all access roads) to minimise potential generation of dust; • Vehicles carrying aggregate material and workings will be sheeted at all times • Maintaining cleanliness by removing dust from machines and vehicles must be a daily practice (sprinkling, vacuuming, cloths) • Conduct periodic checks, according to the legislation in the field, for the machines and means of transport involved in the construction works, so that they are in good technical condition and do not emit noise beyond permitted limits. • All construction machinery and equipment to be maintained in good working order and not left running when not in use • Use modern machines and equipment, which respect the EURO standards regarding the construction of new engines, respectively the emission control systems, considering the global trend of manufacturing engines with low fuel consumption on power unit and restrictive emission controls • Following periodic checks regarding the level of carbon monoxide and the concentrations of emissions in the exhaust gases, if there will be excesses of the allowed indicators (exceeding the limits approved by the technical books of the machines), they will be stopped from working on the Project and returned to service only after remedying defects • Judicious organisation of construction activities, respecting the planned programme and updating it as necessary, will allow smooth flow of traffic and avoid congestion on public roads and the site • Work areas and duration of works will be limited as far as practicable • Site organization will respect the perimeter allocated by the project. • If any complaints or grievances are received from local communities, investigate complaint and take action to remediate or clean up impacted receptor and take measures to reduce dust generation. • Records of grievances must be maintained including action taken and evidence of communication with complainant (see 'Community grievance mechanism' in CEMP)
Operation and Maintenance	• To reduce potential adverse impacts on the air environment, the following general measures will be taken, considering that the project does not pose any risks associated with emissions on air during operations:

Type	Mitigation and management measures
	○ Periodic checks will be carried out on machinery and vehicles used on site during operations and maintenance so that they are in good technical condition and do not emit noise beyond the permitted limits ○ Waste will be stored in specially arranged places for the shortest period of time ○ Internal roads will be maintained ○ Maximum site speeds of vehicles used in maintenance will be imposed
Decommissioning	• Considering the nature of the works carried out by the project, it is estimated that in the decommissioning stage the installations for the retention and dispersion of pollutants in the atmosphere will be the same as in the construction stage
Monitoring	• Air quality visual monitoring of dusts – throughout construction • Inspection and visual monitoring of the works should be carried out at all times • Periodic inspections should be conducted at nearby sites (e.g. villages) to determine whether harmful levels of dust from construction activities exist • Reporting of any excessive levels of pollutants/dust or noise and the measures taken to minimise the impact and prevent it from occurring again. • Review grievance log

12.7. Residual Impacts

Residual significance post-mitigation is summarised in Table 69.

Table 69: Residual Impacts (air quality)

Impacts	Magnitude (pre mitigation)	Sensitivity	Magnitude (post mitigation)	Residual significance (post mitigation)
Negative – during construction (dust and fugitive emissions)	Medium	Medium	Low	Minor
Negative – during operation (dust and fugitive emissions)	Low	Medium	Low	Negligible

12.8. Data limitations and uncertainty

No air quality monitoring has been undertaken in preparation of this ESIA report because it is considered that adverse impacts on air quality from Project construction activities will be limited in magnitude and duration and will be well controlled by appropriate management, mitigation and monitoring identified in the section.

13. TRAFFIC AND TRANSPORTATION IMPACT ASSESSMENT

13.1. Overview of impacts

Traffic movements and the transportation of equipment and workers can harm local roads and impact community health and safety. The health effects include dust and fugitive emissions getting into the eyes and mouths of workers and residents, increased dust particles in the atmosphere, nuisance through surface soiling affecting local ecology, nearby agricultural areas and passing grazing animals. The community safety effects may arise from increased traffic movements and heavy goods vehicles. The road infrastructure and adjacent properties along delivery routes are also considered vulnerable to road quality changes due to the increase in Project vehicles and vibration impacts leading to dilapidation of properties or other infrastructure along the route.

13.2. Receptor sensitivity

The AOI for traffic and transportation impacts is considered the R218 and the local road south of the Project Site. National roads used to transport materials from further afield to Silistra District are considered major trunk roads (as described in the baseline section) and not within Project AOI. The sensitivity rating of receptors in the AOI is summarised in Table 70 below.

Table 70: Receptor Sensitivity (traffic and transportation)

Receptors	Distance from the site	Sensitivity
Local Communities and workforce along R218 and the local road to P. Lambrinovo,	Direct AOI	Medium
Road infrastructure (R218 / local road to P. Lambrinovo) and nearby buildings	Direct AOI	

13.3. Construction phase impacts

The construction phase will generate most of the impact on traffic and transport because of the following actions from the construction site:

- Mobilization of vehicles and equipment, transport of materials
- Construction or improvement of new roads / existing roads
- Earthworks
- Construction of electrical substation and foundations
- Cable laying works (Excavation, trenching)
- Excavation, trenching and cable laying
- Waste management (including transport offsite)

Impacts will be generated by transporting materials and workers to and from the sites. To bring the PV panels to the project location, the baseline looked at two example traffic routes, from the closest two harbours, as representative routes for delivery of Project components to the site through Bulgaria:

- Route 1 – Varna harbour, Bulgaria to the project site – approx. length of 147km (Figure 78)
- Route 2 – Constanta harbour, Romania to the project site – approx. length of 156km (Figure 79).

Traffic impacts are unlikely until the Project traffic turns onto R218, which runs adjacent to the site. Route 218 is a single-carriageway tarmac road illustrated in Figure 90 (Access option 1). Project vehicles may also be required to use the local road to P. Lambrinovo to access the two other alternative access points (Access Option 2 and Access Option 3 as described in section 3.4.1). The latter is the most constrained as it requires vehicles to enter the village of P. Lambrinovo.

Figure 90: Possible access from the road 218 to the project location

The following figures present below a few examples of transportation vehicles needed for the PV panels:

Figure 91*: Pictures with example of trailers transporting PV panels*

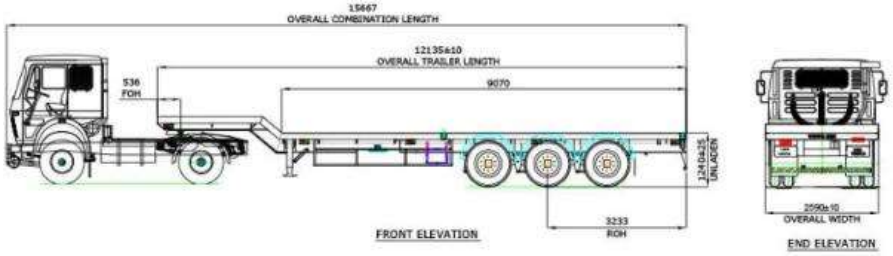


Figure 92*: Example of trailer dimensions needed for PV transport*

Site visit observations indicate low traffic volumes and flow on the 218 and the local road to P. Lambrinovo.

The total number of traffic movements (i.e. two-way trips) is estimated at between 15 and 30 trips per day connected with cement works and equipment delivery during months three to six.

Traffic volumes would taper off during the PV module installation works and taper off even further during commissioning works. There may also be up to four heavy goods vehicle (HGV) movements connected with delivering the transformers and supporting cranes. The traffic increases will be for the duration of the construction period, although movements will be intermittent (in relation to large delivery vehicles) and short-term (considering the duration of the delivery phase).

There may be some deterioration /dilapidation of private property and infrastructure (mainly if Access Option 3 is used) and road surfacing on the R218 and the local road to P. Lambrinovo due to the vibrations from the increased vehicle movements and HGVs. The road is not designed for a concentration of HGV vehicle movements, and the resulting impacts may be permanent if not restored. Increased traffic volume can also lead to community health and safety risks, particularly

for road users along the R218 and the local road to P. Lambrinovo. The overall significance pre-mitigation is summarised in Table 71.

Table 71: Impact assessment – construction phase (traffic and transportation)

Risk of accidents due to traffic increase, interruption/limitation of services , dilapidation of transportation infrastructure and private property– construction phase					
Type	**Duration**	**Extent**	**Frequency**	**Likelihood**	**Magnitude**
Direct	Short term	Local	Continuous	Likely	Medium
Sensitivity					
Medium					
Overall Significance of Impact					
Moderate					

13.4. Operation phase impacts

No project actions will generate impact factors on the traffic and transportation component during the operation phase. Refer to the scoping table in Annex I for further elaboration on this point.

13.5. Decommissioning phase impacts

The impact on traffic and transportation during this phase will be similar to that of the construction phase. The overall impact in this phase is considered medium negative.

13.6. Cumulative impacts

No cumulative impacts are foreseen concerning transport and traffic.

13.7. Mitigation and monitoring measures

The following mitigation and management measures are defined for the Project (OHTL and PV Project unless stated).

Table 72: Mitigation and monitoring measures (traffic and transportation)

	Mitigation and management measures
Design/Contract / Construction	• Conduct pre-transporation survey and Social Impacts Register to feed into the TMP. • Include in Project contract requirements to restore existing roads or private property during or at the end of construction activities. Any improvements will leave a positive legacy on the local road conditions, benefiting the local communities.

	Mitigation and management measures
	• Consider excluding Access option three which requires access through the village of P. Lambrinovo. • Design laydown area and delivery approach to minimise vehicle stopping outside the site access. • Include clause in the EPC contract that that any damage to road (wear and tear over the construction period) must be repaired and 'made good'. • Provide protection from vehicles and heavy machinery to the water pipeline that crosses the site from the existing water tower to P. Lambrinovo (in the form of a demarcated buffer zone).
Project Specific	• Prepare a traffic and transportation management plan (TMP) • Demarcate delivery roads and access tracks across the site and ensure all workers stick to demarcated areas. • CLO to engage the local community to inform them of the start of construction works and timings for large vehicle deliveries • Install appropriate signage to inform local communities and road users of site access points. • No night-time driving along unsurfaced roads. • No night-time deliveries • Maximum of 20 km/h on the section of road between R218 and P. Lambrinovo • During preconstruction surveys, perform a photographic assessment of road condition and private properties adjacent to the local road and R218.
GIIP	Include in TMP the following GIIP as a minimum; • Ensure that local communities are timely informed about road closures, works on roads or use of heavy good vehicles. • Plan and implement awareness campaigns on risks related to the traffic increase, especially in the schools present in the area. • The transportation will be protected and patrolled by the crash trucks and/or possible police escort to guarantee the safety of other road users and to inform the respective authority for the overloaded trucks. • Frequent testing of drivers to eliminate drink driving, also check for use of seatbelts and identify speed limits that are monitored during the construction phase. • Undertake route and access surveys on road conditions and ensure that possible damages to existing roads are repaired promptly and that roads are left in original or better condition. at the end of construction activities • If temporary access roads are necessary, the land required for these works will be returned to its original condition. • Possible use of flag men or other means of traffic control at key points on roads, especially during school hours in the hotspot areas • All vehicle drivers must be in possession of valid driver's license • All drivers must use only designated routes • All traffic signs must be respected

	Mitigation and management measures
	• No vehicles should be driven if loaded in excess of its manufacturer-specified weight bearing capacity • The use of cell phones while driving is prohibited • All accidents and traffic violations must be reported by drivers to the Project Management Team • Only company employees are to be transported in the company vehicle
Operation and Maintenance	Not relevant
Decommissioning	• Decommissioning phase route assessment • Same as construction phase.
Enhancement	• None identified
Monitoring	• Monthly visual (photographic) inspection of all properties along the vehicle delivery route (local road and R218) to confirm status of road condition and private property condition (no change) • Regular (daily) monitoring of dust episodes, soiling of vegetation, dust resuspension on the roads and dust clouds at Project site. • Maintain logbook: record any traffic incidents. • Stakeholder grievance log related to traffic and road condition

13.8. Residual significance

The residual significance post mitigation is summarised in Table 73.

Table 73: Residual Impacts (traffic and transportation)

Impacts	Magnitude (pre mitigation)	Sensitivity	Magnitude (post mitigation)	Residual significance (post mitigation)
Negative – during construction (traffic volumes and transportation)	Medium	Medium	Low	Minor

13.9. Data limitations and uncertainty

None noted.

14. ENVIRONMENTAL NOISE IMPACT ASSESSMENT

14.1. Overview of impacts

Sources of impacts for noise and vibration emissions may include as follows:

- Noise emissions due to earthworks for the PV solar plant, OHTL and any potential rehabilitation of access roads in the area nearby;
- Noise emissions from vehicle movements, transportation activities and working machinery involved in Project construction (i.e., excavators, bulldozers, trucks, roller, etc.);
- Erection of towers and conductors for the OHTL;
- Noise emissions from the use of equipment during construction activities (e.g., generators, compressors);
- Operational noise from inverters and substations close to sensitive receptors

Solar power plants are comprised of relatively lightweight structures (solar panels and mounting infrastructure) with shallow foundations; OHTL towers have very localised foundation installations and are remote from sensitive receptors. Consequently, vibration impacts from the works have been scoped out (refer to the Scoping Table in Annex 1). The traffic and transportation chapter assesses impacts on road infrastructure and private properties along the equipment delivery route.

Construction is generally undertaken in the open, usually of temporary duration, and varying noise levels are produced by several different types of noise sources. Noise levels created by construction machinery and equipment can vary greatly and depend on factors such as the type of equipment, the specific model, condition of the equipment, operation being performed and duration of the activity. There are no standardised criteria for evaluating construction noise and associated impacts; consequently, such criteria must be determined on a project-specific basis. The Project construction noise criteria will consider the existing noise environment, the absolute noise levels during construction activities, and receptor land use.

Project workers will be exposed to noise from construction machinery as well as, potentially, hand-arm vibration from hand-held power tools, or whole-body vibrations from surfaces on which the worker stands or sits. Occupational noise and vibration will be managed through the development of a construction occupational health and safety management plan (OHSMP), which will ensure compliance of the Project with national and international standards/guidelines (e.g., IFC General EHS Guideline) in relation to OHS noise and vibration (see also chapter 17).

Typically noise from operational solar PV power plants is low subject to location of minor noise sources (e.g., inverters and substations) which may need to be addressed if close to sensitive receptors.

14.2. Receptor sensitivity

Noise intensity decreases with increasing distance from noise sources (6dB reduction for every doubling of distance between source and receptor) and with the roughness of the land (the degree

of unevenness of the land and the presence of obstructions or vegetation), with noise levels from construction works returning to background levels within a few hundred metres. The direct AOI for noise impacts is considered to be 250m on either side of the R218 and local roads around the PV Project and within 250m of the construction site boundary and OHTL ROW. Considering the baseline noise level provided in section 6.16, the sensitivity is considered to be high due to the proximity to residential receptors and the current low baseline noise levels.

Table 74: Receptor sensitivity (noise and vibration)

Receptors	Distance from the site	Sensitivity
Workers (at site and along the OHTL)	Within 250 m of the works	High
L-S Protected Area	30 to 250 m of the works	
Community of P. Lambrinovo	10 - 250 m of the works	

14.3. Construction phase impacts

Noise during the construction phase may arise from different work activities. Typically, this includes construction activities such as preparation of foundations for the PV solar plant and OHLs, installation of the necessary structures, backfilling and reinstatement, and movements of vehicles, equipment and personnel. The expected duration of the PV construction consists of a short period for early works and a few months for construction. At the time of preparing this report the construction schedule had not been developed. The final construction schedule will be specified during the detailed design phase, but it is expected that noisy activities will be finalised by month 9 of the schedule. Potential daily construction hours are assumed to be 07:00 – 18:00, Monday to Friday. It should be noted that initial site clearance and site levelling /excavations were undertaken prior to development of this ESIA, and hence some of the noisy earth works have already been completed.

Mechanical equipment which is planned to be involved in the construction of the proposed PV Project and OHTL includes, but is not limited to: track loaders, excavators, hydraulic hammers and breakers, rollers, mobile cranes, air compressors, dump trucks, generators, concrete pump, etc. Anticipated sound power levels of the equipment that will be used are:

- Backhoe: 84-93 dB
- Bulldozer: 93-96 dB
- Concrete joint cutter: 99-102 dB
- Crane: 90-96 dB
- Earth tamper: 90-96 dB
- Earthmover: 87-94 dB
- Front-end loader: 86-94 dB
- Hammer: 87-95 dB
- Jackhammer: 102-111 dB
- Pneumatic chip hammer: 103-113 dB
- Portable saw: 88-102 dB

- Piling rig: 117dB

The level of noise from these items during construction is likely to change based on the use of industry standards and maintenance of equipment/ machinery. The noise level produced in normal operating conditions of the machines and installations used on site for construction activities are typically temporary and do not have significant negative effects on the environment.

The equivalent level of transport noise is determined by the traffic volumes on the construction site and in work areas, composition of the vehicle fleet, weather conditions, background noise in the area, etc.

Anticipated noise generation on the PV site is expected to impact residential receptors with the nearest receptor located only 10m from the site boundary and piling rigs will be operating close to these receptors. The impact on the PV access road will be significant during construction due to the number of materials and panels to be transported and will reduce during operations. Noise impacts of OHTL access roads will only be during construction.

Modelling of noise from the piling rigs, excavators and generators when used within 10 metres, 20 metres and 50 metres of the southern boundary close to the residential properties in Polkovnik Lambrinovo (refer to Decibel dated 18 July 2024) demonstrated that without mitigation noise levels are likely to be above the required standards, as shown in Table 75.

Table 75. Modelled construction noise levels without mitigation, daytime, dB(A)– receptor P1

Pos	Distance to receptor (m)	Modelled noise level without construction noise sources (dB(A))	Modelled noise level withconstructio n noise sources (dB(A))	IFC noise standard (daytime) dB(A)	Increased noise level due to construction noise
1	10	44.6	69.1	55	24.5
2	20	44.6	64.7	55	20.1
3	50	44.6	59.7	55	15.1

The OHTL routes pass over agricultural land and intermittent noise impacts are unlikely to be experienced by residents or road users in the vicinity of the construction locations of the OHTL towers. Some local farm workers may experience intermittent increases in general construction-related noise for a few weeks. As construction will be limited to daytime hours during weekdays, there will be no noise disturbance at night or weekends.

Other potential noise emissions may arise from vehicle movements in the project area. The roads to be used during the construction are in the vicinity of inhabited areas; increased traffic causes noise and vibration impacts. Project-related traffic is limited to daytime; therefore, impacts from noise and vibration are considered minimal. Overall, the impacts are characterised as short-term (6-10 months) since they will last until the end of the construction period and will have local (assumed to be up to 250m) impacts[81]. During the initial stage of project mobilization, there will

[81] Following finalisation of the construction noise modelling, this AOI may increase or decrease.

be an increased level of traffic while equipment and materials are transported to the main PV solar site. Vehicle movements will continue throughout construction of the project. Noise will be more evident in inhabited areas where road transport will pass. Noise and vibration emissions from vehicle movement are predicted to be lower than other types of noise generation and will be short-term.

Table 76: Impact assessment - construction phase (noise)

Construction activities, equipment and machinery and traffic– construction phase					
Type	**Duration**	**Extent**	**Frequency**	**Likelihood**	**Magnitude**
Direct	Temporary	Local	Daily / Temporary	Likely	Medium
Sensitivity					
High					
Overall Significance of Impact					
Major					

14.4. Operation phase impacts

Operational noise impacts were assessed in detail following completion of noise monitoring and modelling which are presented in the report by Decibel dated 21 May 2024. The following section assess the operational impacts based on the noise modelling results.

Typically, operational PV power plants have limited noise sources with the potential to adversely impact sensitive receptors. In this Project there will be some noise sources (inverters, substation transformers) in the south-west of the operational solar power plant close to the residential areas of P. Lamrinovo[82].
Early-stage design information indicates that inverters and a substation have a design noise level of 75dB (each) and the nearest residential receptors would experience nighttime noise levels of in excess of the requirements of the Bulgarian standard (Regulation 6) and IFC requirements without mitigation, as reported in Table 77. It should be noted that measurement points P2 and P4 are on the northern side of the solar power plant (refer to

[82] The magnitude of the expected noise impact will be modified following completion of the noise modelling assessment.

Figure 80) and no sensitive receptors will be impacted by noise from the solar power plant. Measurement points P1 and P3 are representative of the nearest noise sensitive locations.

Table 77 Modelled operational noise levels without mitigation

Measurement point	Measured baseline sound pressure, dB(A) (nighttime)	Modelled sound pressure levels with operational noise sources, dB(A)- (nighttime)	Regulation 6 noise requirement dB(A)- (nighttime)	IFC EHS guidelines dB(A)- (nighttime)*
P1	37.0	47.4	45	**45 / +3**
P2	30.9	52.0	45	**45 / +3**
P3	34.5	53.5	45	**45 / +3**
P4	**49.4**	**52.1**	**45**	**45 / +3**

* IFC nighttime noise requirement of 45dB(A) or a maximum increase of 3dB(A) above pre-development baseline noise levels and the most stringent requirement must be complied with.

It is noted that by the nature of operation of a solar power plant (no generation during the hours of darkness) the inverters will be on standby during the hours of darkness and will be significantly quieter than during daylight hours. Due to seasonal variations of sunrise and sunset times, for approximately six-months of the year the sun will rise prior to the end of the IFC designated 'night-time' period of 22:00 to 07:00 and a worst case scenario in which the inverters operate at 100% of their operational noise level from sunrise has been assumed in designing the noise mitigation measures (sound reduction). Proposed mitigation measures are presented in section **Error! R eference source not found.** .

Proposed mitigation measures are presented in section **Error! Reference source not found.**.

Figure 93: Impact assessment - operations phase (noise)

Operations phase					
Type	**Duration**	**Extent**	**Frequency**	**Likelihood**	**Magnitude**
Direct	Permanent	Local	Daily	Likely	Major
Sensitivity					
High					
Overall Significance of Impact					

High

14.5. Decommissioning phase impacts

Decommissioning activities will generate noise and vibration emissions of similar intensity and duration as during the construction phase. As a result, impacts will be similar to those experienced during the construction phase. Management and mitigation measures are similar to those during the construction phase.

14.6. Cumulative impacts

There are not anticipated to be any cumulative noise impacts from construction activities or during the operation and decommissioning phases.

14.7. Mitigation and management measures

14.7.1. Noise impact risk assessment

Construction and decommissioning

During construction and decommissioning phases of the project it is required that all activities undergo a noise risk assessment to identify potential for noise impacts on nearby sensitive receptors (residential, schools, clinics etc). This is particularly important in the south-west area of the site which borders the village of P. Lambrinovo. As an example, piling and excavation activities including for foundations of solar panel arrays, temporary construction roads, or permanent works to improve existing public or site roads are likely to have a high risk of noise emissions with potential impacts on nearby sensitive receptors, whilst mounting solar panels on frames and electrical connection works will have a low risk of generating noise. Table 78 provides an example of a noise risk assessment which will be adopted by the Contractor for this Project.
Construction noise impacts were assessed in detail and modelling undertaken (refer to Decibel report dated 18 July 2024, Volume 3) (also refer to section 14.4) which shows that without mitigation there is potential for adverse noise impacts on the nearest sensitive receptors; see Table 75).

British Standard BS5228-1:2014, '*Code of practice for noise and vibration control on construction and open sites. Part 1: Noise'* (or suitable equivalent guidance), represents good international industry practice (GIIP) for noise control on construction sites and will be used as the main reference for guidance on controlling noise impacts during construction.

Records shall be kept of noise risk assessments for all activities, even where no risks exist, so that evidence can be provided during audits to show that appropriate measures are being taken to assess noise risks and manage potential adverse impacts.

When an activity is identified as having a significant (medium or high) risk of emitting noise with potential to be carried beyond the site boundaries and cause adverse impacts on sensitive receptors, appropriate measures shall be applied to eliminate or minimise adverse impacts. Examples of such measures include timing of higher noise activities to avoid working outside the normal working

day or during weekends, installation of temporary noise barriers (hay/straw bales for example, which are usually readily available in rural locations) or machinery enclosures and advising local residents of planned noisy activities. Appropriate mitigation and management measures are identified in Table 79.

The measures will also include suitable monitoring by ongoing observation and vigilance throughout the identified activities (i.e., not limited to daily observations) to ensure that mitigation measures are applied promptly and effectively to eliminate or minimise noise impacts.

Table 78: Noise generation risk assessment

Stage	Description	Potential noise generating activities	Distance to nearest sensitive receptor	Noise generating potential/ magnitude
Site preparation (main site, OHLT and access road(s))	Site survey work. Vegetation clearance Access road construction Construction of storage and work areas Acquisition of borrow-pit material	Excavation works Transport of materials	<250m 250m-500m >500m	High - Major High - Minor High - Negligible
Site enabling works (main site, OHTL and access road)	Installation of new roads as required New civil infrastructure, potentially including piling for new foundations Site drainage works Shallow foundations for electrical plant and security fencing Movement around site Road consolidation	Excavation works Transport of materials	<250m 250m-500m >500m	High – Major High - Minor High - Negligible
Plant installation	Movement of equipment around site Mounting of solar PV panels to the pre-constructed concrete foundations/frameworks Transmission towers erection	Transport of materials Wind	<250m 250m-500m >500m	Low - Minor
Electrical and control	Installation of electrical cables, equipment, etc. Conductor stringing	Transport of materials	<250m 250m-500m	Low - Minor

Stage	Description	Potential noise generating activities	Distance to nearest sensitive receptor	Noise generating potential/ magnitude
			>500m	
Commissioning	Testing of control systems and software with no additional activities required		<250m 250m-500m >500m	Low - Minor

Operations

Operational noise impacts were assessed in detail following completion of noise monitoring and modelling which are presented in the report by Decibel dated 05 June 2024 (also refer to section 14.4 and Volume 3) which shows that without mitigation there is potential for adverse noise impacts on the nearest sensitive receptors (refer to Table 77).

14.7.2. Mitigation and management measures

Measures to eliminate or mitigate noise are applied to the sources that produce noise, the transmission path from the source to the receptor, or the receptor itself; elimination or mitigation at the source is the preferred approach wherever practicable. There are two methods in noise reduction techniques:

- Active protection, which seeks to eliminate sound sources that, due to a faulty design, produces noise and/or vibrations with very high intensities;
- Passive protection seeks to increase the resistance that the medium through which the noise is transmitted opposes its propagation (eg barriers, plenum chambers).

The following noise prevention and mitigation measures should be applied.

Table 79: Mitigation and management measures (noise and vibration)

Type	Mitigation and management measures
Design/contract / construction	• All equipment should ensure less than 85d(B) A at 1m from the equipment. • Reduce project traffic routing through community areas wherever possible (consider exclusion of access option 3) •
Project specific	• No noisy or high-noise activities are to be undertaken outside regular working hours (7am to 6pm) without prior approval of the Project Company. • Install temporary noise barriers when carrying out foundation piling and other noisy works within 50 metres of residential property boundaries. Barriers shall be 10 metres in length around each noise source, 4 metres high and overlapping the noise source by two metres; barriers shall have a noise reduction index of 29dB. (Note – noise reduction may be achieved using straw bales as the noise barrier.) Noise monitoring shall be undertaken during

Type	Mitigation and management measures
	initial stages of piling within 50 metres of noise sensitive receptors, with the noise barriers in place, to demonstrate that the desired reduction is achieved • Locate all equipment and laydown area at least 250m from any sensitive receptors (specifically in P. Lambrinovo and L-S Protected Area). • All observations and non-conformances will be managed through a corrective action tracker and reviewed weekly. • No blasting without prior approval of the Project Company.
GIIP	• Equipment maintenance, and noise/ vibration emissions and monitoring during construction will be managed through the development of a robust construction environmental management plan (CEMP). The mitigation measures for noise impacts will include the following: • Adhering to a speed limit of 15 km/h on unpaved site roads and 20km/h on unpaved site roads, site access roads for trucks on the construction site • Development of the CTMP (see mitigation measures propose for traffic management); • Taking advantage of the natural topography as a noise buffer during facility design • Temporary acoustic screening if required; installing acoustic enclosures for equipment casing radiating noise • Select equipment with lower sound power levels • Install suitable mufflers on engine exhausts and compressor components • Install vibration isolation for mechanical equipment • Avoid simultaneous work activities that generate high levels of noise/ vibration emissions; • Prior notification of local residents in case of important work activities that generate noise and/or vibrations; • Restriction of construction activities to daytime hours and weekdays; • Limiting the hours of operation for specific pieces of equipment or operations, especially mobile sources operating through community areas • Developing a mechanism to record and respond to complaints (grievance mechanism)
Operation and Maintenance	• Install noise attenuation devices (barriers, plenum chambers etc) at noise sources that are demonstrated in the environmental assessment to impact sensitive receptors (particularly P. Lambrinovo) • Design and install appropriate noise barriers and/or acoustic louvres to reduce nighttime noise increase to less than 3dB(A) from preconstruction baseline levels. • Monitor daytime and nighttime operational noise at sensitive receptor locations to demonstrate success of mitigation measures. Monitoring should be undertaken within three months of commencement of full operations and be repeated every six-months until three consecutive monitoring events show noise levels are not significantly (max 3dB) above pre-construction baseline levels.

Type	Mitigation and management measures
	• Implement GIIP measures during maintenance activity • Confirm legal limits on noise exposure are not exceeded • Monitor grievance log for noise-related complaints and take appropriate action to address such complaints
Decommissioning	• Considering the nature of the works carried out by the project, it is estimated that in the decommissioning stage the installations for the retention and dispersion of pollutants in the atmosphere will be the same as in the construction stage
Enhancement	• None noted
Monitoring	• Monthly construction noise measurements of the noise level at the nearest sensitive receivers. The noise level will be measured near the nearest house in the P. Lambrinovo (minimum of 2 points) and at the access road of the PV plant from road 218 during the material transport activities and compared to the admissible limits. • Monitor the grievance log for noise-related complaints. • Conduct noise monitoring in case of a noise complaint or evidence of exceedance of community noise guidelines values.

Construction

The construction noise modelling report by Decibel dated 24 June 2024 includes construction noise mitigation using a barrier with a length of 10m and a height of 4m with a sound insulation index RV of 29 dB. The barrier must overlap the work site by 2m in plan and be movable during the work process – it is envisaged that locally sourced straw or hay bales could be used. The modelled residual noise Is presented in Table 80.

Table 80 Modelled construction noise levels with mitigation dB(A) - daytime

Position	Distance to receptor (m)	Modelled noise level with construction noise sources (dB(A))	Modelled noise level with construction noise sources and noise barrier (dB(A))	IFC noise standard (daytime) dB(A)	Increased noise level due to construction noise with noise barrier (dB(A))
1	10	69.1	45.1	55	0.5
2	20	64.7	44.2	55	0.0
3	50	59.7	44.5	55	0.0

Reference to Table 80 shows that the proposed noise barrier provides sufficient noise reduction for noise at sensitive receptors to comply with the requirements of IFC noise guidelines (daytime noise not to exceed 55dB(A) and not to increase more than 3dB(A) above pre-project baseline)

Operation

The modelling report by Decibel dated 05 June 2024 includes designs for noise barriers and louvres to reduce night-time noise increase to less than 3dB(A) from preconstruction baseline levels. These noise reduction measures shall be incorporated into the design and construction of the solar plant. With these measures installed the noise levels presented in the modelling report and shown in Table 81 will be achieved.

Table 81 Modelled operational noise levels with mitigation dB(A), night-time

Location	Modelled baseline sound pressure	Modelled sound pressure levels with operational noise sources,	Modelled sound pressure levels with operational noise sources – with soundproofing	IFC EHS guidelines	Remaining exceedance
P1	37.7	47.4	35.0	45 / +**3**	-2.7
P2	29.8	52.0	52.0	45 / +**3**	N/A
P3	34.1	53.5	43.2	45 / +**3**	+1.6
P4	52.4	52.1	52.1	45 / +3	N/A

Reference to Table 81 shows that the proposed insulated noise barriers and louvres provide sufficient noise reduction for the sensitive receptors (P1 and P3) to comply with the requirements of IFC guidelines (night-time noise not to exceed 45dB(A) and not to increase more than 3dB(A) above pre-project baseline.

The predicted noise reduction below the pre-project baseline at location P1 is because the baseline noise is produced by various point sound sources, some of which are located in the solar park area, and by adding additional sound absorption and the barrier effect of the solar panels themselves, the background noise in this area is also reduced.

14.8. Residual significance

The residual significance post-mitigation is summarised in Table 82.

Table 82: Residual significance (environmental noise)

Impacts	Magnitude (pre mitigation)	Sensitivity	Magnitude (post mitigation)	Residual significance (post mitigation)
Negative – during construction/ decommissioning	Medium	High	Minor	Minor
Negative – during operation	Major	High	Minor	Minor

14.9. Data limitations and uncertainty

All noise modelling has inherent uncertainty and minimal deviation between the modelling and actual noise levels is possible. The uncertainty and effectiveness of mitigation will be tested by noise monitoring during operations as detailed in Table 79.

15. LAND USE IMPACT ASSESSMENT

15.1. Overview

Potential impacts of the Project activities on land use during the various phases include impacts during the construction phase and operation phase. Land and servitude rights are in place for the Project (PV Site and OHTL ROW) as described in section 2.5. The Pelikan OHTL will traverse 75 private agricultural land plots, 1 republican road that is state property, and 12 field roads that are municipal properties. The Dorostol OHTL traverses additional land plots, to be confirmed by the LRP. No additional land is required at this time. The current Land acquisition impacts will be confirmed during the pre-construction phase as part of the LRP development and any additional compensation or livelihood restoration activities will be completed before the commencement of construction.

A summary of the estimated permanent land take requirements for the Project is provided in the table below.

Table 83: Estimated total land take requirements

Land Type	Permanent/temporary	Area (m^2)	Land use rights
Total PV Site (including laydown area)	Permanent for the duration of the land lease agreement.	1,658,513 (~164,2ha)	YGY Industries to grant the Project Company a property right to build (superficies) over the Project Plots.
Tower footprints	Permanent (acquisition)	3,0 m x 3,0 m (9m2) to 7,2 m x 7,2 m (51m2) footprint(intersection with ground level) per pylon	Farmers / Leaseholders
Right of way	Permanent (right of way) however only temporary impact on land use in the right of way (i.e. during construction of OHTL)	132,000 [83]	Farmers / Leaseholders

Project activities with the potential to impact land use principally relate to the OHTL and include.

- Acquisition of the Project footprint by Project Company from YGY Holdings in:
  - Loss of land rights for YGY Holdings
  - Loss of land rights to private land holdings within the Project boundary

[83] Connection to "Dorostol" OHTL goes in east direction with an approximate length of 2.3km to the interruption point. Connection to "Pelikan" goes in north direction with approximate length of 3.7km to the interruption point. The ROW is estimated at 12m either side of the ROW.

- Cancellation of the land lease for farmers in the OHTL ROW

- Construction activities and temporary use of land for access to agricultural land on the main PV site leading to economic displacement.

It is understood there are no livelihood impacts connected with the main PV Site the site is understood to be farmed by previous owner employees, hence no evidence of livelihood loss in the main airport site. FGDs and KII did not reveal that there were any previous livelihood related incomes related to the site and no participants indicated and previous use of the site while it was an airfield or since. The LRP will include further information about whether any livelihood activity was supported in this way. and confirm that land clearance work did not impact livelihoods.

Construction activities and temporary land use impact along the ROW of the OHTL leading to economic displacement. To date, 78 Project Affected People (PAPs) have been identified. The total number of PAPs who use the land (including potential informal land users), together with any potential impacts on ecosystem services and access to natural resources, is currently unclear (however, it will be quantified during the development of a project-specific Livelihood Restoration Plan (LRP).

The footprint of the OHTL towers will cause a permanent economic displacement impact for the lifetime of the Project (however, it will be a small impact). In addition, site clearance for the OHTL ROW, access roads and temporary laydown areas/camps have the potential to impact access to crops leading to temporary economic displacement. Temporary land take will be localised and focussed on Work fronts at the tower locations along the route. Temporary economic displacement at each tower footprint is short-term (approximately two to three weeks during tower foundation works and steel erection) and one to two weeks during conductor stringing). Permanent economic displacement equates to a loss of area between 9m2 and 51 m2 per tower. The land rights owners of the PV Project AOI are YGY Holdings (a private company). This land will be leased to the Project Company based on mutually agreed conditions. The land for the PV Site is not currently used for cropping or grazing. No physical displacement is necessary for this Project. Receptor sensitivity.

The AOI for potential land use impacts identified for the planned works is defined as the Project footprint, including the tower foundation locations, the ROW under the OHTL, and any temporary work areas. Table 84 summarises the relevant receptors and their sensitivity for OHTL.

Table 84: Summary of receptor sensitivity (Land use) (OHLT)

Receptors	Distance from the site	Sensitivity
Persons who own the land plots will be acquired (main PV site)	Direct AOI	Medium
Persons who own the land plots which will be leased /servitude for the project OHTL, and whose land and crops may be affected by construction (temporary and permanent economic displacement).	Direct AOI (tower) and ROW	Medium
Persons who are using the land plots which will be crossed during the transport and installation of the pylons in their future locations or other land which may be disrupted during construction, whose crops may be affected (temporary economic displacement).	Direct AOI and ROW	
Persons who are using the land plots which have been acquired for the project, but who are not owners of land, and whose crops may be affected by construction	Direct AOI and ROW	
Informal land users whose activities have benefited from the land use and whose crops might be affected by the project implementation.	Direct AOI and ROW	

15.2. Construction phase impacts

The following project actions will generate economic displacement impacts during the preconstruction phase:

• Surface levelling and grading.

The following type of economic displacement impacts will occur during the preconstruction and construction phase in terms of land use.

- **Land necessary for permanent facilities**: the project plots of land have the right to build on the Project Company, from current landowners and will permanently change their status (at least for the entire construction and operation phase), hence it will not be possible to conduct current activities. Landowners and will be compensated for the losses.
- **Land necessary for temporary facilities**: if land is required outside the main PV site boundary for location of temporary facilities, this land will be leased directly from current landowners for the required duration. If leasing this land also leads to a restriction of economic activities, the compensation agreement will also cover loss of income e.g. from crop damage for the required duration which may be equal to the entire construction period or shorter.

An estimation of the potentially economically displaced people on all project components including the OHLT is provide in

Table 85.

Table 85:Estimation of displaced people on the all-project components

Project component	Number of physically displaced people	Number of potentials economically displaced people	Comments
PV Main site	0	3	Permanent displacement
OHLT Pelikan	0	75	Temporary and permanent (tower footprints) displacement
OHLT Dorostol	0	TBC	Temporary and permanent (tower footprints) displacement

The majority of land is required for the implementation of the PV Plant. Formal users of State land have been compensated for servitude. The LRP will consider the need for compensation of crops (if not already included) and identify any informal users of state land eligible for compensation.

Those who are going to be more affected are the landowners along the OHTL route. Some of them have more than one parcel or plot affected by the Project, and, in this case, the impact will be higher than for those partially affected or affected only by the Easement. The area of the OHTL is a fertile agriculture area with the majority of the land planted with annual crops, but there are also areas planted with perennial crops. For the OHTL, this means that either one season's crops or no crops will be affected (depending on the season in which construction is carried out on particular plots). Landowners have been compensated for the temporary occupation of land and for the loss of crops. Construction of the OHTL will take between 2 and 3 months and sequentially along the line, so impacts in any one area will be for a short duration. If informal land users are identified these will be further compensated under the LRP in accordance with the requirements of PS5

During the upgrading of access roads and as a result of increased traffic, particularly the presence of heavy vehicles, some of the local farmers may have temporary difficulties accessing their plots of land. In such way the magnitude of the impact might be higher in temporary land plot use and in perception. This impact may occur only occasionally, under certain circumstances, but nevertheless it will be managed to prevent impacts on livelihoods and preserve good community relations.

Table 86: Impact assessment – construction phase (land use)

Reduced access to land and temporary lease – construction phase					
Type	**Duration**	**Extent**	**Frequency**	**Likelihood**	**Magnitude**
Direct	Short-term	Project footprint	Temporary	Likely	Medium

Sensitivity
Medium
Overall Significance of Impact
Moderate

15.3. Operation phase impacts

During operation and maintenance, the project footprint will reduce to the tower foundation area only and the access tracks to the right of way. Typically, maintenance works do not require vehicle access and a team of one or two persons only. No livelihood issues are anticipated during this phase, but if they arise, they will be manged in accordance with the provisions defined in the Livelihoods Restoration Plan (LRP) aligned with PS5. If crops are present, every effort will be made to manage the works to avoid significant impact on crops (e.g. to access the tower by foot) or to time the works outside the main growing seasons.

15.4. Decommissioning phase impacts

Potential impacts to employment associated with the decommissioning of the PV Site will entail temporary to short-term work. The land will return to its legitimate owners, and they can continue activities without any restrictions after regenerating the soil quality and revegetation. Overall, during decommissioning, the impact will be proportionally inverse from that during the construction phase, minor positive.

15.5. Cumulative impacts

Given the nature of the project and its location, it is estimated that there will not be a cumulative impact on land use.

15.6. Mitigation and monitoring measures

The following table presents a series of mitigation and management measures identified to eliminate or reduce the impact to acceptable levels based on the impacts identified in section 15.2, 15.3, 15.4) .

Table 87: Mitigation and monitoring (economic displacement,)

	Mitigation and management measures
Design/Contract / Construction	• The activities within the perimeter will be carried out on the strictly necessary surfaces, provided by the project, without the occupation of additional lands.

	Mitigation and management measures
	• Construction equipment and means of transport will only transit the areas provided by the project, on well-established routes, without affecting additional land surfaces. • Materials, raw materials and/or waste warehouses will not be set up in the vicinity of the locations, on other surfaces than those provided by the project (existing project boundary). • The technological processes that produce a lot of dust, such as the case of earth fillings, will be reduced in periods of strong wind or a more intensive wetting of the surfaces will be carried out, to avoid affecting the use of the neighbouring lands. • The waste will be temporarily stored strictly in the areas provided by the project, until it is handed over to specialized companies in order to take over the waste from the site - this way the land in the vicinity of the project will be avoided by the waste produced on the site. • After the completion of the construction works, the Builder will have to sanitize and restore all the surfaces used for any purpose during the works, in a way that meets the environmental protection measures. Thus, the areas provided to be temporarily removed from the agricultural circuit will be returned to the agricultural circuit after the completion of the construction works. • Upon the completion of construction activities, fully reinstate leased land and ensure it is handed over in its original conditions, to the extent possible
Project Specific	• Develop, implement, and monitor an LRP aligned with national law and IFC PS5 and assess the project's land acquisition process, including land acquisition and easement rights secured by the previous developer, and identify any inconsistencies with IFC PS5. • Ensure all compensations prior to the commencement of the construction activities.
Operation and Maintenance	• The periodic collection of packaging and especially household waste, strictly on the surfaces provided by the project. • The means of transport and/or the machines that will ensure the maintenance/repair activities of the PV plant will only use the exploitation roads provided by the project, on well-established routes, without affecting the surrounding surfaces. • The waste will be temporarily stored strictly in the areas provided by the project, until it is handed over to specialized companies in order to take over the waste from the site - this way the land in the vicinity of the project will be avoided by the waste produced on the site. • Once the project is operational, there will be a minor impact for those with permanent loss of land from the towers/ pylons, while the agricultural activities on the remainder of the land will resume as usual. • Affected people need to raise grievances for damages to crop or lands following maintenance activities
Decommissioning	• Same measures as in the construction phase
Enhancement	• Not necessary.

	Mitigation and management measures
Monitoring	• Biannual monitoring reports during the construction phase • Annual reports during operations until all the LRP activities are completed. • Closeout monitoring survey one year after all LRP measures have been implemented to confirm alignment of the LRP with PS5 and, as appropriate, propose any closeout measures. • Three years after all the LRP activities have been deemed complete, the company's LRP consultant will conduct a completion audit to assess the implementation outcomes against agreed objectives and confirm whether livelihoods have been restored to pre-project levels or better or if supplemental action is required.

15.7. Residual significance

Considering the application of the abovementioned mitigation measures, the residual impact on the land use is depicted in the following table.

Table 88: Residual significance (land use)

Impacts	Magnitude (pre mitigation)	Sensitivity	Magnitude (post mitigation)	Residual significance (post mitigation)
Negative - during Construction	Medium	Medium	Low	Minor
Positive - during decommissioning	Medium	Medium	Medium	Minor

15.8. Data limitations and uncertainty

There can be a high degree of uncertainty regarding decommissioning as engineering approaches and technologies evolve over the operational life of the Project.

16. SOCIAL IMPACT ASSESSMENT (including community health, safety and security)

16.1. Overview of Impacts

In the current context, characterized by the alarming increase in pollution caused by the production of energy from the burning of fossil fuels, it becomes increasingly important to reduce the dependence on these fuels. Solar energy is among the forms of renewable energy that lend themselves to small-scale applications. The main advantage of solar energy is the zero emission of pollutants and greenhouse gases since no fuel is burned.

All solar projects have aroused interest from the community from the beginning. This is perfectly normal if the population must live in the presence of PV plant for the next decades. From the developer's experience, it can be stated that in general, communities and local authorities have a a neutral attitude to the project. A small proportion of people interviewed during the perception survey and the FGD's indicated a cautious attitude towards the Project, citing concerns relating to electromagnetic fields from the solar Project, and negative impact on climate that may in turn impact on agricultural productivity. There are also concerns about the clean-up of demolition waste that has been disposed by the previous owner in an unapproved location near the village. Older persons interviewed during the FGD's and socio-economic survey indicated that they are hopeful that the Project will provide opportunities for young people.

Regarding the social and economic impact, the PV Project will provide opportunities for people to work on the construction of the plant for up to one year . Indirectly, a positive impact will also be registered through the increase of trade activity in the indirect area to provide goods and services necessary for the implementation and operation of the project. Less people will be employed (less than 10 maximum) during the PV Projects operation period. A Local Hiring Plan will be developed by the Contractor in accordance with the Ownre Local Hiring Policu that is defined in the Project Company Labour Management Plan. This will set out hiring needs will be ascertained from the Contractor and it's subcontractors and communicated to the Project Company CLO and onward to the Project community. In addition, the Project Company CLO will work with PACs (via the Mayors) to identify interested persons and service providers so that this information may be passed onto the Contractor. The number of jobs and services that may be soured from the PAC's is limited considering the availability of the service providers and skilled persons, however, given the low numbers of available workers, even a nominal hiring, with a specific focus on unemployed youth, will have a positive benefit.

Overall, the impact on the economic conditions is a positive one given by the transfer to the Local Councils, of a contribution to the local budget.

Additional revenues will also be generated by payments to contractors, builders, and suppliers during the installation of the PV plant, as well as by payments to the long-term maintenance staff of the PV plant. Solar plants also help expand the local tax base.

Finally, the exploitation of solar energy is also beneficial for the economy by reducing the "hidden costs" resulting from air pollution and health expenses.

Over 400,000 people die annually in the European Union because of air pollution. This is the result of a report presented in Copenhagen by the European Environment Agency. The document analyses data on the influence of the environment on the health and well-being of Europeans. According to the study, in Europe air pollution would be, as before, the biggest threat to health.

[84]Bulgaria has the third highest death rate in the world caused by air pollution, according to the World Health Organization. Every year, over 15,000 people in the country die prematurely due to air pollution. It also leads to reduced productivity and costs for treating diseases caused by pollution. Bulgaria is almost in constant breach of European air quality legislation and has already been found liable on multiple occasions. That is why, a decision was made at a round table organized at the National Assembly to include the WHO's findings and recommendations in the draft of the 2021-2030 National Health Strategy.

Thus, the implementation of the project can have a positive effect, in terms of the health of the country's population and the reduction of pollutant emissions, which could be emitted because of conventional processes of obtaining energy.

Therefore, the establishment of the PV plant will benefit the local communities through the significant contribution to the local budget and the creation of new jobs.

It should be noted that no displacement of houses is necessary for this Project.

Effects on community members from electromagnetic fields have been scoped out, refer to Annex 1 – Scoping table.

16.2. Receptor sensitivity

In general, the primary receptors for the Project can be considered to be the communities of the direct AOI and indirect AOI; the project workforce and vulnerable groups. These are discussed in more detail in the impact assessment tables below.

Table 89: Summary of receptor sensitivity (social)

Receptors	Distance from the site	Sensitivity
PAP in Lambrinovo, Smilets, Tsenovich [Cenovic]	Direct AOI and ROW	High
PAP in indirect AOI Kalipetrovo, Aydemir, Silistra	Direct AOI and ROW	
Project Workforce	Direct AOI and ROW	
Vulnerable groups (women, unemployed, Roma and Turks minority groups and those people with disabilities)	Direct AOI and ROW	

[84] https://bnr.bg/en/post/101749303/who-bulgaria-has-the-third-highest-death-rate-in-the-world-caused-by-air-pollution

16.3. Construction phase impacts

The following social impacts are assessed for the Project construction phase:

- Inaccurate information and negative perceptions towards the Project.
- Impacts on the regional economy during construction and procurement.
- Impacts from the use of security personnel.
- Community health and safety risk from temporary labour influx

Community health and safety impacts arising from dust, noise, traffic, and transportation, health and safety are addressed in the other chapter.

16.3.1. Inaccurate information and negative perceptions towards the Project

The outcome of stakeholder engagement activities performed by the elaboration of the present ESIA version has indicated their general support towards the Project although there are ongoing concerns related to the inappropriately disposed aggregate and demolition waste that was disposed near to the Site (refer back to section 10) and suspicions related to the benefits that may be realised for the local community. Some reservations and questions have been asked about the health risks (electromagnetic fields) and noise risks and these have been considered during the ESIA process and addressed in the relevant sections. This information will be fed back to the community as part of the ongoing stakeholder engagement activities defined in the SEP.

There is a ongoing risk that communication associated with the Project is mis-interpreted, either because the information is seen to be controlled by the state government, or from a lack of understanding of potential Project impacts such as sunlight reflection of the panels during operation and noise during construction. The Table below sets out the likely impacts from inaccurate information and negative perceptions towards the Project.

Table 90: Likely impacts from inaccurate information and negative perceptions towards the Project on vulnerable people and PAPs

Project stage	**Preparation**	**Construction**	**Operation**	**Decommissioning**
	The impact in relevant to all stages of the Project			
Impact Nature	**Positive**		**Negative**	
	The impact is negative as people living in the vicinity the Project Area may have inaccurate perceptions towards Project impacts, or unrealistic expectations of potential benefits, such as local electrification or the quantity of jobs available.			
Impact type	**Direct**	Indirect	**Reversible**	**Irreversible**
	The impact is direct because perceptions of risk influence people's behaviour			

	and general wellbeing. The impact could be both reversible and irreversible.				
Impact Duration	Temporary	Short-term	Medium-term	**Long-term**	Permanent
	The impact is long-term as it will continue throughout the Project, even during the preparation stage when final details of the Project are disclosed to people in the Project Area.				
Impact Extent	**Local**		**Regional**	National	
	The impact will occur at a regional and local level.				
Impact magnitude	Negligible	Low	**Medium**	**High**	
	Impact magnitude is high to reflect the scale and uniqueness of the Project. The Project is the first solar power investment in the community. The arrival of the Company into the region therefore represents a significance change.				
Gender and Vulnerability Considerations	**Yes**		No		
	There is the possibility that sections of the population in the Project Area experience change differently due to their age, gender, and other source of vulnerability. Elderly people may particularly be concerned about the Project's adverse impacts as they are not likely to directly benefit through employment opportunities that more younger people may be able to access. However, the FGD's indicaed that most older people were pleased to see that there might be opportunities for the youth of the area. Residents and farmers may assume that women are not interested or eligible for employment opportunities (which is not the case according to engagements with women performed during the FGDs). There is also the possibility that local people perceive that operation of the PV Plant will adversely affect their health, even if noise is within acceptable limits, due to a lack of understanding of the Project's impacts. This could start during construction phase when noise effects begin for the first time.				
Receptor Value /Sensitivity	Negligible	Low	Medium	**High**	
	The sensitivity is high as people's perceptions towards the Project is important as this has potential consequences to their general wellbeing, anxiety, aspirations for the future, and influences their future decisions.				
Impact Significance (negative impact)	Negligible	Minor	Moderate	**Major**	
	The overall significance for negative impacts is major.				

16.3.2. Impacts to the regional economy during construction and procurement.

The Project will positively influence the regional economy during construction from the direct procurement and supply of materials and services from companies based Silistra Province and elsewhere Bulgaria. This includes, for example, companies providing earth moving equipment and workers to complete general civil works, logistics services to transport the panels to the project

area, and other required materials. There is also the potential for people in surrounding smaller villages to work as drivers, if they have valid driving licences. Other companies located outside of Bulgaria will be responsible for the supply of PV plant components. Table 91 below sets out the impacts on the local, regional economy during construction, because of the Project.

Table 91: Likely impacts on the local, regional economy during construction, because of the Project

Project stage	**Preparation**	**Construction**	**Operation**	**Decommissioning**	
	The impact is relevant to the preparation and construction stages of the Project where procurement on materials and services will take place.				
Impact Nature	**Positive**		**Negative**		
	The impact is largely positive because construction activities will generate economic growth at a local, regional level through the procurement of services and materials.				
Impact type	**Direct**	**Indirect**	**Reversible**	**Irreversible**	
	The impact is both direct and indirect because the company will pay taxes during the purchase of materials and services and generate indirect economic opportunities as Project suppliers procure materials and services from their own internal supply chain networks. The impact is reversible as it will only continue during the construction stage.				
Impact Duration	Temporary	Short-term	**Medium-term**	**Long-term**	Permanent
	The impact is medium-term as construction works are expected to continue for a period of approximately few months.				
Impact Extent	**Local**		**Regional**	National	
	The impact is expected to occur at a local and regional level. SMEs[85] based in the neighbouring areas/ provinces are expected to be able to provide general civil works and other services throughout the construction period. Local people may also be recruited to worker as drivers, if they have a valid driving licence.				
Impact magnitude	Negligible	Low	**Medium**	**High**	
	The impact magnitude is medium because the total capital expenditure incurred by the Project Company during construction is expected to be a reasonable contribution to the annual economic output of Silistra. Where local companies are to be used, the impact magnitude to the owners of these businesses is expected to be medium-high depending upon the actual level of capital spend.				
Gender and vulnerability Considerations	Yes		**No**		
	There are gender and vulnerability considerations associated with this impact, as there is an opportunity for the Project to use SMEs that are either owned				

[85] Small and Medium-sized Enterprises

	by women and/or employ a high number of women to provide materials and personnel during construction. This could involve a range of roles/materials such as uniforms, catering services, cleaning services, and potentially other more specialist activities.			
Receptor Value /Sensitivity	Negligible	Low	**Medium**	High
	The receptor value is medium as the use of SMEs based in the region will have multiple clients and the Project's contribution to their revenue and profitability will vary depending upon the overall size of the business. For some SMEs, their involvement in the Project may result in a significant increase in business turnover during construction which may represent a substantial boost to their annual revenue and profits. It is also possible that the SMEs will recruit additional staff.			
Impact Significance (negative impact)	Negligible	Minor	**Moderate**	Major
	The overall impact significance is moderate. This is a positive impact, and no mitigation is required although there is an opportunity for enhancement measures to be adopted.			

16.3.3. Impacts from the use of security personnel.

During the construction stage, private security personnel will be used by the Project to provide general security in the construction working areas to ensure that there is no entry of unauthorised personnel, and that construction equipment is safe and secure. There is the potential for security personnel to use excessive force that results in damage to the Project's reputation and act as a trigger point to result in reputational loss or negative perceptions towards the Project. Security personnel will be present during the operational stage in significantly lower numbers. Based on the information currently available on the Project, no security personnel involved in the Project will be armed with munitions (firearms). Table 92 below sets out the potential impacts of using security personnel for the Project.

Table 92: Potential impacts from use of security personnel as a result of the Project

Project stage	**Preparation**	**Construction**	**Operation**	**Decommissioning**
	The impact is relevant to all stages of the Project as security personnel will be used throughout.			
Impact Nature	**Positive**		**Negative**	
	The impact is negative as the presence and behaviour of security staff may result in a rise in local tensions if they behave in an inappropriate manner			
Impact type	**Direct**	Indirect	**Reversible**	**Irreversible**
	The impact is direct because it involves the use of the Project's security staff and their potential interactions with local people. The impact is reversible as			

	it is hoped that even if an incident occurs, this is unlikely to result in permanent damage.				
Impact Duration	Temporary	Short-term	Medium-term	**Long-term**	**Permanent**
	The impact is long-term as the security personnel will be present throughout the duration of the Project. The numbers of security present during the operational phase will be significantly lower when compared to the construction phase.				
Impact Extent	**Local**		Regional	National	
	The impact will occur at a local level only where the security personnel is present.				
Impact magnitude	Negligible	**Low**	Medium	High	
	The magnitude of the impact is low, as the potential for multiple incidents occurring that involve large numbers of people, is remote. If an incident does occur, it is likely to be restricted to a small number of people.				
Gender and vulnerability Considerations	Yes		**No**		
	There are no gender and vulnerability considerations for this impact.				
Receptor Value /Sensitivity	Negligible	Low	Medium	**High**	
	The receptor value is high as even a single incident could act as a trigger for local protests, result in damage to the Project's reputation, or result in an injury to a local community resident.				
Impact Significance	Negligible	Minor	**Moderate**	**Major**	
	The potential impact significance is moderate, given the above magnitude and receptor sensitivity.				

16.3.4. Impacts on community health and safety from temporary labour influx

The proximity of the nearest communities to the Project and the rural nature of the location makes it likely that there will be significant issues with community members entering the Project site. Temporary labour influx of people (either for work, or with the hope to obtain work) can cause strains on local infrastructure and risk to local communities, particularly from solo male workers, often referred to under the banner of gender based violence and harassment (GBVH). The location of accommodation is unknown, but likely to be in existing houses, hotels in the indirect AOI. Another risk at this stage is related to the influx of workers in the Project Area that can lead to an increase of communicable diseases among the population. This value impact however is considered to be limited, considering that interactions between workers and local population will be limited. The presence of workers can also lead to potential tensions and conflicts with the local population, in case of inappropriate behaviours.

Table 93: Likely impacts on community health and safety (temporary labour influx)

Project stage	**Preparation**	**Construction**	**Operation**	**Decommissioning**	
	The impact is relevant to the construction stage during periods of temporary labour influx and early construction works and the resultant pressures on community infrastructure, the risk to community members (particularly elderly and females) and safety risks from the Work itself.				
Impact Nature	**Positive**	**Negative**			
	The impact is negative due to the introduction of workers in the vicinity of local communities, which can increase conflict and GBV risk between workers and female community members. There is also a disproportionate level of older adults in the direct AOI communities that will be more vulnerable to risks than others, or they may have difficulties in receiving Project benefits.				
Impact type	**Direct**	**Indirect**	**Reversible**	**Irreversible**	
	The impact is both direct and indirect because the company will interface with the direct AOI communities related to actual conduction works and the indirect AOI for employment and accommodation matters.				
Impact Duration	Temporary	**Short-term**	Medium-term	Long-term	Permanent
	The impact is related to the duration of the construction phase (maximum of 12 to 18 months), but probably a lot shorter and mostly confined to the civil works and installation phase.				
Impact Extent	**Local**	**Regional**	**National**		
	The impact will occur at a regional and national level as energy will be injected into the national grid.				
Impact magnitude	Negligible	Low	**Medium**	**High**	
	The magnitude of the impact is medium.				
Gender and vulnerability Considerations	Yes	**No**			
	Temporary labor influx of people (either for work or with the hope to obtain work) with resultant accommodation needs can place more risks to females and older people. It can also put community members at risk of conflict with workers or at greater risk of contracting communicable diseases.				
Receptor Value /Sensitivity	Negligible	Low	**Medium**	**High**	
	The proximity to the sit to the PAP community and the high prevalence of women and older people results in a high sensitivity.				
Impact Significance	Negligible	Minor	**Moderate**	**Major**	
	The overall impact significance is moderate.				

16.1. Operational phase impacts

- Impacts on the regional economy during the operation of the Project.

- Community health and safety risks from electromagnetic fields (operation only)
- Community health and safety risk from fire

16.1.1. Impact on community health and safety (Electromagnetic fields)

Electric and magnetic fields (EMF) exist wherever electric current flows e.g., in power lines and cables, residential wiring and electrical appliances. Electric fields (ELF) are produced by voltage and increase strength as the voltage increases. Electric field strength is measured in volts per meter (V/m). Magnetic fields are produced by the current, which measures the flow of electricity, which increases in strength as the current increases. Electromagnetic fields are measured in units of tesla (T). Electric fields are shielded by materials that conduct electricity, and other materials, such as trees and building materials, whilst magnetic fields pass through most materials and are difficult to shield. Most electric power operates at 50 or 60 cycles per second or hertz (Hz), termed 'extremely low frequency (ELF). Short-term effects can include established biological effects from acute exposure at high levels (well above 100 μT) explained by recognized biophysical mechanisms.

Electricity from solar panels and transmission to the power grid emits extremely low frequency electromagnetic fields. Studies into the health effect sof ELFs to determine a link between EMF and concludes that an association between ELF magnetic field exposure and health effects is weak in all cases. In some instances (i.e., cardiovascular disease or breast cancer), the evidence suggests that ELF's do not cause them86.

There is no possibility of EMF impacts from ELFs generated at the PV site or the OHLT associated with the project's construction phase, since the electrical equipment will not be energised at this stage. The EMF impacts during the construction phase have not been considered further in the ESIA.For the solar panels, the distance from the modul structure to the site boundary is 5m and 10m to the nearest inverter. The nearest residential receptors are approximately 15m from the panel and 19m from the nearest inverter.

Table 94 provides detail on the EMF field values at various distances from the OHTL. The table shows that the field falls away to ICNIRP Exposure Guidelines values within 25 m from the OHTL centre line (i.e. within the ROW). Overall, the possibility of receiving high-level short-term exposure to EMF in exceedance of ICNIRP 1998 exposure guidelines is negligible.

Table 94: Magnetic and electric field from 500 kV OHTL at various distances from the centre line

500 kV	Magnetic Field (microteslas) uT	Electric Field (volts per metre)
Maximum field (under line)	100	11,000
Typical field (under line)	5-10	3000-5000
Typical field (25 m to side)	1-2	200-500

86 NRPB, 2004. Review of the Scientific Evidence for Limiting Exposure to Electromagnetic Fields (0-300 GHz). Documents of the NRPB: Volume 15, No. 3, 2004.

Famers or workers in the area will not be within the setback area long enough for significant exposure periods to arise. The possibility of receiving high-level short-term exposure to EMF in exceedance of ICNIRP 1998 exposure guidelines is negligible.

Furthermore, the possible effects of EMFs on various animals have been studied several times, and no detectable effects of EMFs have been found[87]. There is general agreement that EMFs have not been shown to have any detectable effects on crops, pasture grasses or native flora.

Workers undertaking maintenance along the OHTL route and in the substations can potentially be exposed to higher levels of EMF for prolonged periods. However, it is assumed that the utility operator has an EMF exposure safety program as part of its operational management protocols, but this must be checked as part of the utility operational management system

Table 95: Likely impacts on community health and safety (EMF)

Project stage	**Preparation**	**Construction**	**Operation**	**Decommissioning**	
Impact Nature	**Positive**		**Negative**		
	Electricity from solar panels and transmission to the power grid emits extremely low frequency electromagnetic fields.The impact is negative due to the introduction of solar panels and OHTL to the project area.				
Impact type	**Direct**	**Indirect**	**Reversible**	**Irreversible**	
Impact Duration	Temporary	**Short-term**	Medium-term	Long-term	Permanent
	The impact is related to the duration of the operational phase.				
Impact Extent	**Local**		**Regional**	**National**	
	The impact significantly decreases away from the source and is typically considered to be negligible levels up to 25m away from the source. Overall, the possibility of receiving high-level short-term exposure to EMF in exceedance of ICNIRP 1998 exposure guidelines is negligible				
Impact magnitude	Negligible	Low	**Medium**	**High**	
	The magnitude of the impact is negligible				
Gender and vulnerability Considerations	Yes		**No**		
	Although the scientific research points to negligible impact from EMF including no positive links to health effects such as cancer, there is a widely held perception that EMF is linked to cancer which can in turn mean that some land users / landowners will not return to work on their land under the				

87 NRPB, 2004. Review of the Scientific Evidence for Limiting Exposure to Electromagnetic Fields (0-300 GHz). Documents of the NRPB: Volume 15, No. 3, 2004.

	OHTL or adjacent to the solar power plant. It is necessary to ensure that measures are taken to monitor return to previous land uses under the OHLT and adjacent to the site and to undertake some community awareness raising activities in a particular for vulnerable populations groups (e.g. elderly, poorly educated).			
Receptor Value /Sensitivity	Negligible	Low	**Medium**	**High**
	The proximity to the site to the PAP community and the high prevalence of older people results in a high sensitivity.			
Impact Significance	Negligible	Minor	**Moderate**	**Major**
	The overall impact significance is negligible			

16.1.2. Impact on community health and safety (fire / lightning strike risk)

There is a possibility that the solar farm will catch fire. Typical causes include:

- System design errors
- Faulty electrical products—often stemming from sub-par quality of cables and connecters
- Poor installation practices or irregular maintenance
- Lightning strikes

Although fires at solar plants may be underreported, some studies do suggest that the prevalence of the risk is low. One 2021 study by the Fraunhofer Institute for Solar Energy Systems found that, of the more than 2 million PV plants in Germany, .006% of them caused a fire resulting in serious damage. They also found that the majority of these fires were as a result of faulty cabling and connections, factors that could occur in any electrical system.[88] Mitigation measures relating to emergency preparedness and vulnerability considerations of the older population are provided in section 0. These should also consider the risk of live electrical current prevailing even in a fire situation. Fire can happen due to the overcurrent, or an electrical arc on inverters which will have their own current protection system to decrease the fire risk and help contain the fire to the electrical cabinet at the point of system failure.[89] Only in very worst-case scenarios, would neighbouring area suffer power shortages or environmental or safety hazards due to large-scale solar farm fires. A fire safety plans designed by authorized designer has already been prepared and approved under construction permitting by the Bulgarian authorities.

A direct lightning strike on a conductor of a power line causes extremely high voltage pulses at the strike point, which are propagated as traveling waves in either direction from the point of strike. Lightning strikes on electrical lines or substations are those that cause problems in the distribution network. The Power Lines are always protected in case of lightning strikes, but sometimes lightning does happen to strike the line or the earthing of the wires. Also, the substation might be

[88] https://www.firetrace.com/fire-protection-blog/how-often-do-solar-farm-fires-occur

[89] https://www.firetrace.com/fire-protection-blog/what-happens-when-a-solar-farm-catches-on-fire?hsCtaTracking=172b03d5-821f-4f20-af41-afab58f2f023%7Cf5b7fe3a-4c9e-4ab4-b4e1-bb26b5a9ce18

subject to lightning strikes or fires but will be designed with a fire protection system. Hazardous situations may occur, these include downed power lines that may still be energized, associated fires, unstable structures, and wet/damaged electrical panels. It is mandatory to verify that all the electrical and safety measures have been followed in the designing of the power line in order for the overhead transmission line to be safe and pose no health risks to local residents during operation. Regarding the unauthorised access of people, the probability may be low, but the consequence could be severe.

Table 96: Likely impacts on community health and safety (fire/lightning strikes)

Project stage	**Preparation**	**Construction**	**Operation**	**Decommissioning**	
	The impact is relevant to the operation stage and refers to operations under abnormal operating scenarios (e.g. due to a fault or lightning strike).				
Impact Nature	**Positive**		**Negative**		
	The impact is negative due to the introduction of solar panels in the vicinity of local communities which may impact the community. The proximity of the nearest residential receptor is 100m from the nearest equipment also increases the impact magnitude.				
Impact type	**Direct**	**Indirect**	**Reversible**	**Irreversible**	
	The impact is direct.				
Impact Duration	Temporary	**Short-term**	Medium-term	Long-term	Permanent
	The impact is related to the duration of the operation phase (25 years), but the frequency is considered to be low. .				
Impact Extent	**Local**		**Regional**	**National**	
	The impact will occur at a local level within the village of P. Lambrinovo.				
Impact magnitude	Negligible	Low	**Medium**	**High**	
	The magnitude of the impact is low.				
Gender and vulnerability Considerations	Yes		**No**		
	The population of P. Lambrinovo is predominately elderly and therefore any community response requirements in the event of an emergency must be tailored to the specific needs of this population group (e.g. support to evacuate, personal alarms etc.)				
Receptor Value /Sensitivity	Negligible	Low	**Medium**	**High**	
	The proximity to the site to the PAP community and the high prevalence of older people results in a high sensitivity.				
Impact Significance	Negligible	Minor	**Moderate**	**Major**	
	The overall impact significance is minor.				

16.1.3. Impacts to the regional economy during the operation of the Project.

Operation of the Project features 199 MW, all of which will be linked to the national transmission

grid. The Project will use SMEs for ongoing support during operations, such as consulting, legal, and accounting companies. There are no anticipated adverse impacts to the tourism sector identified. Table 97 below sets out the impacts to the national and regional economy during operation.

Table 97: Likely impacts to the national and regional economy during operation

Project stage	**Preparation**	**Construction**	**Operation**	**Decommissioning**	
	The impact is relevant to the operation stage when energy is being generated.				
Impact Nature	**Positive**		**Negative**		
	Impact is positive because the operation of the Project will generate energy, which is fed into the national grid, contributing towards the ongoing development of the country using a low-carbon, renewable source. The Project may also attract follow-on developments.				
Impact type	**Direct**	**Indirect**	**Reversible**	**Irreversible**	
	The impact is both direct and indirect because the company will provide energy to the national grid which will benefit other electricity users (households, businesses, and government buildings), pay taxes, purchase materials and services which will lead to the growth of small and medium business. The impact is reversible as it will only continue during operation.				
Impact Duration	Temporary	Short-term	Medium-term	**Long-term**	**Permanent**
	The impact is long-term because it would continue throughout the whole period of Project operation.				
Impact Extent	**Local**		**Regional**	**National**	
	The impact will occur at a regional and national level as energy will be injected into the national grid.				
Impact magnitude	Negligible	Low	**Medium**	**High**	
	The magnitude of the impact is medium, as the Project will contribute with renewable solar energy into the national grid, together with other companies in Bulgaria.				
Gender and vulnerability Considerations	Yes		**No**		
	There are no gender and vulnerability considerations for this impact.				
Receptor Value /Sensitivity	Negligible	Low	**Medium**	**High**	
	The sensitivity is medium as Bulgaria's energy demand will continue to increase during the lifespan of the Project.				
Impact Significance	Negligible	Minor	**Moderate**	**Major**	
	The overall impact significance is moderate.				

16.2. Socio-economic impacts during decommissioning.

The socio-economic impacts expected during decommissioning are like those experienced during construction, as there will be increased road traffic movements, use of a workforce to remove the PV plant elements, dismantle the substation infrastructure, incoming presence of a workforce and regional use of hotel facilities, and the presence of security forces. All these impacts during decommissioning will be managed in a near-identical manner to construction, and the impact assessment and mitigation and monitoring measures are not repeated in this section. The key change arising from decommissioning primarily relates to the future use of the land using for the panel's laydown. However, the extent of redundancy depends on the future use of land. If the panels are to be replaced with new ones, then it is likely that the level of redundancy will be reduced, if not eliminated as an incoming 'construction' workforce will effectively be mobilised to the site to replace the panels as part of a construction stage of a new project. Closer to the end of Project life, a Decommissioning Plan will be prepared that reflects the Project Company's final decision in relation to the future use of land (the land will continue to be used for industrial purposes i.e. energy generating, or agriculture use) and this will include measures to transition the operational workforce into the 'new' Project's workforce to eliminate the need for redundancy, and/or address any other relevant impacts arising from decommissioning. On this basis, there are no significant (positive or negative) impacts expected during decommissioning other than redundancy.

n addition to the above, there is the possibility that some Project infrastructure will be left at request of local community representatives or farmers. This presents a potential liability and there is a risk that there may be misunderstandings associated with who is responsible for the maintenance of such infrastructure, and who is responsible for maintaining it in a safe manner to people and livestock. The Decommissioning Plan prepared for the Project shall be developed before the decommissioning stage and include written agreements that reflect who is responsible for maintenance and community health and safety of all handed-over infrastructure.

16.3. Mitigation and enhancement

The following table sets out the relevant mitigation measures for the construction, operation and decommissioning phases to bring project impacts identified above to acceptable levels.

Figure 94: Mitigation and management measures (social)

Phase	Mitigation and management measures
Design/Contract / Construction	• Look for opportunities to unbundle procurement contracts so that local community members have a greater chance of supplying the Project and advertise procurement contracts locally and in local languages. • Where possible (i.e., the suppliers are competitive and can meet the technical requirements which need to be achieved), the Project Company (and their contractors) will seek to procure materials and services from SMEs based in the neighbouring locations to ensure that the positive effects of using SMEs are experienced as close to the Project site as possible to

Phase	Mitigation and management measures
	enhance the positive benefits of the Project at this location. This includes SMEs owned by women which shall be identified by the Company during the Project execution stage. Details will be included within the Contractor and Supply Chain Management Plan. • Incorporate safety requirements into the project design. • Where necessary include fencing, safety signage (in locally used languages) and other relevant features to deter community members from entering the Project site. • No workers to be housed in P. Lambrinovo or Smilets. • House temporary workers from outside the area from the direct AOI in accommodation away from the immediate communities as much as possible, thereby reducing potential social tensions and manage this in accordance with the Project Company Accommodation policy aligned to IFC/EBRD standards for accommodation. • Installation of anti-climbing devices to avoid accidental or intentional attempts to climb infrastructure; • Painting with fluorescent colours of towers near the roads to make them visible. • Install fire suppression and notification system • Establish a proactive maintenance program that includes the replacement of old/defective parts • Create and clearly communicate standard quality assurance metrics in the EPC contract • Develop a regular schedule to have PV solar systems tested by third-party experts
Project specific - construction	• Information awareness campaign related to electromagnetic fields, climate impacts to inform community and improve community perception about risks. • Include in the traffic and transportation management plan (TTMP) measures to transport Project components as well as transportation of workers. • Prepare a disclosure plan for community members, to inform as to the start of construction works and timing and Project impacts along the transportation route (via the local Mayor in each PAC) • Require all workers to sign a “code of conduct – workers” and code of conduct and GBVH training to all workforce as part of the induction process. • Undertake a stakeholder engagement campaign to inform community members of the possible risks and impacts of the construction of the Project (refer to SEP), including traffic, grievance mechanism, worker conduct, GBVH risks. • Conduct community awareness campaign around the topic of EMF and safe working under OHTL (e.g. project leaflets).

Phase	Mitigation and management measures
	• Include provision for alerting local community in the event of a fire with particular consideration for elderly population demographic. • CLO to undergo regular training and capacity building on IFC PSs • Liaise with Mayor for local hiring opportunities in PAC (focused on women and youth), consider opportunities for driving jobs roles based on a project specific Local Hiring Policy (to be developed). • Undertake a GBVH risk assessment and service provider mapping to support community and GBVH grievance mechanism. • Sensitise the community grievance mechanism in particular amongst women.
GIIP - construction	• Prepare a plan/strategy to guard workers and community members against contracting communicable diseases. • Employ local security guards and female guards where possible • Undertake cultural awareness training for migrant workers, should it be deemed necessary. • Undertake OHS and emergency drills throughout the construction and operations phases. Security Personnel will have to: • Be trained in the rules of force, culturally appropriate engagement, and the Project's grievance mechanism. • Wear a uniform so that they are easily identified as security personnel, including a unique reference/label that can be used to make a grievance about a specific person. • Have adequate communications equipment so that personnel can request support during the start of any incident. • Details about the Project's grievance mechanism that can be used to address any concerns promptly associated with the actions of security personnel and details as to how this is to be disclosed.
Operation	Ongoing implementation of the SEP and grievance mechanism
Decommissioning	As per construction phase
Monitoring	• Stakeholder engagement completed (stakeholder log) (all phases) • Active monitoring of the number of community grievances received (grievance log). Responses and follow up actions(all phases) • Periodic focus groups with community members to identify any impacts related to influx of people and put together mitigation measures, if identified (construction and operation). Number of Security incidents
Enhancement	To strengthen the positive effects, the following enhancement measures will be implemented: • The Project will record the capital spend and location of SMEs used during the operational period so that an accurate record is available of the companies involved, broken down by their geographical location. • The Project will record the Project's generation of energy and contribution to the national grid. This information will be collated and compiled into future E&S Performance Reports to provide stakeholders with accurate

Phase	Mitigation and management measures
	information about the Project's contribution towards the countries energy generation sector.

To support this implementation, the Project has developed a SEP that sets out clearly what information will be provided and when to people living in the Project Area before the start of construction activities and ongoing thereafter. (subject to well managed stakeholder engagement an dlocal hiring program). Risk associated to unmet employment expectations can be high if management of the requirements of the SEP are not done well.

The SEP and SE program will be updated throughout the life of the Project. The SEP contains the following:

- Stakeholder identification to identify all stakeholders and a Stakeholder analysis to reflect their level of influence on the Project, and how they could be impacted.
- Engagement action plan – for pre-construction, Construction, Operation and Decommissioning phase
- Engagement tools
- Resources and responsibilities - The Community Liaison Officer (CLO) will have the overall responsibility for the implementation and updates of SEP.
- Details of the grievance mechanism and how information associated with the mechanism will be disclosed to stakeholders, and how grievances raised will be resolved.
- Monitoring, evaluation, and reporting

16.3.1. Residual impact assessment

During the operation period, a positive impact is manifested through:

- building an objective of strategic importance in the current conditions of the crisis of the resources used in obtaining electricity.
- new and rehabilitated infrastructure.
- the transfer to the local budget of taxes.
- reducing the unemployment rate in the area by creating new jobs.

From this point of view, the impact of the project's objectives is a positive one, because by making this investment, temporary and permanent jobs will be created.
It is also estimated that the impact on the socio-economic environment will be positive through the conversion of the existing function of the land (former military airfield), according to the data presented in this study.

Table 98 sets out the predicted residual impacts of the Project construction phase from the use of security personnel and other risks following the implementation of mitigation.

Table 98: Residual significance (social inc. community health and safety)

Impacts	Magnitude (pre mitigation)	Sensitivity	Magnitude (post mitigation)	Residual significance (post mitigation)
Negative – (inaccurate information)	Medium	High	Low	Minor
Positive – impacts to regional economy	Medium	Medium	High	Minor
Negative – impacts from the use of security personnel	Low	High	Low	Moderate
Negative - Impact on community health and safety from temporary labour influx	High	High	Medium	Moderate
Positive – operation	Medium	High	High	Major

17. OCCUPATIONAL HEALTH AND SAFETY IMPACT ASSESSMENT

17.1. Overview

An Occupational Health and Safety Management Plan (OHSMP) will be developed by the Contractor and will specify the Health and Safety statutory requirements, specifications and standards to be applied to the Project, and how these will be managed. The purpose of this plan is to cover all related OHS matters, emergency preparedness and response, incident and disaster management, the prevention, management and rehabilitation of injuries and illnesses, and specific identification and management of hazards and risks associated with the workplace.

The plan will detail the measures taken by the Contractor to manage the hygiene conditions and medical care in each of the workers camps. It will also address occupational health & safety in alignment with IFC PS2, ILO recommendations and Good International Industry Practices (GIIP). This plan shall include at least the following topics:

- Health and safety policy and commitment from management
- Description of organization; human resources, definition of roles and responsibilities
- Worker's accommodation, hygiene facilities and food supply, and to meet the requirements of IFC Guidance Note on accommodation
- Description of material resources including Personal Protective Equipment (PPE) to be used by workers
- Health and safety procedures
- Risk assessment
- Pollution prevention and protection
- Monitoring of health and safety performance, and
- Medical checks
- Training and skill development activities
- Employee grievance mechanism
- Measures for fair treatment, non-discrimination, and equal opportunity in employment
- Requirements related to provision of safe and healthy working conditions, and the health of workers
- Management of potential communicable diseases associated with construction workforce
- Local Content measures address inter alia: Promotion of local recruitment at all levels of the Project and facilitating the qualification and recruitment of local candidates, for example with appropriate skills training. Measures to maximize use of national subcontractors and suppliers
- Workers' community interaction behavioural code of conduct (including GBVH)
- Contractor employment practices conformance, reporting and monitoring
- Management measures related to child labour, forced labour, third-party workers.

A health and safety risk assessment based approached shall be taken during the construction phase to manage H&S risks to workers. This would involve assessing all the various risks that are involved in each aspect of the job and educating workers on how to manage these risks. The people working around the area shall also be warned of the risk involved i.e., warning signs shall be erected for people to see clearly.

Effects on workers from electromagnetic fields have been scoped out, refer to Annex 1 – Scoping table.

17.2. Receptor Sensitivity

Table 99: Summary of receptor sensitivity (OHS)

Receptors	Distance from the site	Sensitivity
Project Workforce	Direct AOI and ROW	Medium
Vulnerable groups represented in the workforce (women, youth, Roma and Turks minority groups and those people with disabilities)	Direct AOI and ROW	

17.3. Potential impacts during construction phase (PV and OHTL)

The following project actions will generate impact factors on the health, safety and security component during the construction phase:

- Mobilization of construction equipment, vehicles, workers and equipment
- Transport of materials and waste
- Vegetation clearance
- Demolition works
- Levelling off the ground;
- Construction/improvement of internal and external access roads;
- Construction of electrical substation and foundations;
- Excavation, trenching and cable laying;
- Marking out of foundation, earth works and excavations;
- Installation of foundations and grounding devices;
- Assembly, installation, alignment and fixing of panels.

The potential impacts deriving from the above can be associated with following impact factors:

- Increase of traffic
- Increased risk of traffic hazards and incidents associated with the use of roads for workers
- Emission of dust and particulate matter
- Emission of noise and vibrations

The construction of the PV and of the OHTL, like all large industrial and infrastructure construction projects, carries with it several key health and safety risks to the workers employed on the project as well as members of the surrounding communities. Key issues for consideration associated with the proposed project are as follows:

- Ground excavation hazards;
- Traffic;
- Working at height and/or in confined spaces;
- Potential for electrocution;
- Issues associated with unauthorised access and vandalism.

If local accommodation does not meet IFC requirements for workers' accommodation, the Contractor must take responsibility to directly manage / upgrade the accommodation to meet the required standard.[90]

There is also a risk of GBVH within the workforce, given the fact that in construction projects like this one, the majority of workers is likely male.

The impact on occupational health and safety of the project during construction is considered medium negative.

Table 100: Potential impacts during construction phase (occupational health and safety)

Aspect					
Risks on health, safety and security - Influx of workers, construction works and excavations, influx of workers, increased traffic and movement of vehicles, noise and air emissions during construction					
Type	**Duration**	**Extent**	**Frequency**	**Likelihood**	**Magnitude**
Direct	Short-term (during construction activities)	Local	Continuous	Possible	Medium - PV Plant and OHTL
Sensitivity					
Medium					
Overall Significance of Impact					
Moderate – PV Plant and OHTL					

17.4. Potential impacts during operation phase

The following actions can generate impact factors on health, safety and security component during the operation phase:

- Operation and maintenance of the PV
- Operation and maintenance of the OHTL

[90] IFC/EBRD Workers accommodation: processes an standards - https://www.ifc.org/en/insights-reports/2000/publications-gpn-workersaccommodation

- The potential impacts on community health, safety and security deriving from the above actions are associated with the following impact factors:
- Generation of electromagnetic fields
- Potential for electrocution
- Lightning strike and fire
- Potential issues associated unauthorised access and vandalism

Regarding electrocution, the unauthorized access in electric towers or Power Lines can lead to fatalities for the unauthorized people. These are extremely rare cases, but it might happen that unauthorized people or children playing might access the electric towers.

Overall, the impact in operational phase is considered to be minor negative for PV plant and Moderate for OHTL as per Table 101.

Table 101: Potential impacts during operation phase (occupational health and safety)

Aspect					
Risks on health, safety and security - electromagnetic field from the OHTL, risk of electrocution, lightning strike, maintenance activities for the PV Plant and OHTL					
Type	**Duration**	**Extent**	**Frequency**	**Likelihood**	**Magnitude**
Direct	Long-term, Permanent	Local	Continuous	Possible	Low - PV Plant and OHTL
Receptor					Sensitivity
Workforce and local communities					Medium - PV Plant and OHTL
Overall Significance of Impact					
Minor – PV Plant and moderate for OHTL					

17.1. Potential impacts during decommissioning phase

Generally, the health and safety risks from decommissioning activities will be similar to those during the construction phase. The project will be designed to reduce potential risks during its decommissioning.

The impact on health, safety and security is considered to be minor negative during this phase.

17.2. Management and Mitigation

Potential impacts on workers' health and security can be managed through specific Management Plans, in order to reduce risks to the extent possible. Safety and security measures will have to be applied by all workers, both of Contractors and Subcontractors. The safety measures will be acknowledged by staff and any visitors prior to entering the working site and to interaction with local communities.

Project phase	Mitigation and management measures
Design/Contract	• Incorporate GIIP engineering controls in Project design. • Incorporate measures to reduce the risk of these hazards impacting the project as per national codes and norms and international standard specifications. • Require Contractor to be certified to ISO 45001 (or equivalent) • Require Contractor to implement communication systems to enable communications from any part of the site. • Specify safety signage throughout the Project site, following GIIP specifications and codes of practice. • Design of the route of the OHTL to avoid health risk for the public and ensure the OHTL does not pass directly over any residential property • Preventative maintenance to ensure the robust connection of the lighting protection (earthing) system • Recommended techniques to prevent the electrocution hazards include use of signs, barriers, to prevent shock; • The provision of automatic fire detection systems linked to automatic shutdown systems will allow them to be dealt with in the shortest possible time by disconnection from the power supply systems. This prevention is connected with the Substation; • After any damage has been assessed and documented in case of storm damage / wind damage, the utility companies will be notified. Lastly, if safe to do so, the damaged areas will be protected from further damage

Project phase	Mitigation and management measures
	• Inverters to have current protection system to decrease the fire risk
Project Specific	• Establish a comprehensive Construction, Operations and Decommissioning OHS Plans (at relevant times throughout the Project lifecycle). • Ensure all workers receive worker induction and regular ongoing training • Contractor and subcontractors to hire HSE Managers and Officers (1:50 for construction workforce) • Conduct Project specific risk assessment. • Develop a project specific Emergency Preparedness and Response Plan (EPRP) • Include in the EPRP a medical evacuation procedure to enable injured workers to access appropriate emergency facilities. • Ensure medical preparedness includes permanent on-site paramedic, first aid facilities and first aiders (ratio of 1:50 first aiders/workers) on site. • Provide worker shelter, toilets and provisions (including drinking water) at work fronts across the site (not just at the main site camp). • Contractor to employ at least one HSE Manager and an Contractor HSE Officer for every 50 workers. • Subcontractors with more than 20 workers shall deploy a dedicated HSE Officer and an additional HSE Officer for each additional 50 workers deployed onsite. • Implement mitigation measures in relation to lead in the soil (including an assessment of required personal protective equipment (PPE) for workers and training in the risk of lead contamination).
GIIP	• Workers to receive correct PPE, free of charge and to be replaced when needed. • Workers must receive appropriate training, prior to commencement of work and on an ongoing basis through toolbox talks, oriented by training plans. • Mock drills (including OHS, spills, and emergency drills) should be undertaken regularly. • First aid facilities to be available at all work fronts. • Establish an accident and incident reporting procedure. Including providing incentives for reporting near misses and corrective actions.
Operation and Maintenance	• Establish an operational OHS Plan. • Define workplace protocols for maintenance activities. • Employ EHS officer to oversee Project Company obligations (may be based off site). • Define operations auditing, inspection, and reporting schedule.

Project phase	Mitigation and management measures
	• Update the emergency preparedness policy and emergency preparedness and response plan for the operations phase. • Disclose updated emergency preparedness and response plan to local emergency services and other relevant external stakeholders (e.g., nearby communities). • Perform continuous monitoring of storm events: e.g., site lock-down securing all equipment and materials.
Decommissioning	• The same as the construction phase.
Enhancement	• None identified.
Monitoring	• Numbers of fatalities, accidents and injuries. • Daily H&S inspections by qualified personnel. • Construction and operations auditing, inspection and reporting schedule. • Reviews of incident and accident reporting, drill reporting and any corrective actions identified, where relevant.

18. LABOUR IMPACT ASSESSMENT

18.1. Overview of impacts

The following project actions will generate impact factors on the economy and, employment component during the construction phase:

- Procurement
- Mobilization of vehicles, workers and equipment, transport of materials and waste;
- Surface levelling and grading;
- Pile driving for mounting structure;
- Excavation, trenching and cable laying;
- Marking out of foundation, earth works and excavations;
- Installation of foundations and grounding devices;
- Assembly, installation, alignment and fixing of pylons;
- Construction of buildings.

The potential impacts on economy and, employment deriving from the above actions are associated with the following impact factors:

- Demand for workforce;
- Demand for goods, materials and services.

18.2. Receptor sensitivity

The primary receptors for Project are considered to be the local communities in the direct and indirect AOI (where the local workforce may be sourced), and the Project workers. Sensitive labour receptors are summarised in Table 102.

Table 102: Project labor receptors

Receptor	Description	Sensitivity
Contractor (salaried) workers	Will be impacted during the construction and operation phases.	Medium
Contract workers	Only impacted during construction, but less likely to have protections and knowledge of rights.	
Supply chain workers (construction)	Workers responsible for providing material and equipment including high risk products such as solar panels and transformers, where there is a high risk of forced labour and other labour non-compliances for certain products from certain regions of China.	
Local community members	These communities have potential for employment or procurement impacts during the construction or operations phases but may not have knowledge of their rights.	

18.3. Construction phase impacts

Given the nature of the Project and skills required, it is likely that the Contractor will bring a significant proportion of it's skilled workforce from outside the Project area. As stated in section

2.17, the total workforce required during the peak construction period may be up to between 250-500 workers (skilled and non-skilled), but the exact expected breakdown of the workforce, (local, expatriate) is not known at this time. There is potential for a small amount of unskilled or semi-skilled temporary employment generation during the construction phase that will result from construction of the foundations and building structure, drivers and security work This type of work may be sourced from the local communities. To assists this as much as possible the Employer will develop a local hiring policy that promotes the use of local workers where possible. Local Content is defined as "the utilisation of labour, goods and services originating from within Bulgaria and includes skills and/or technology transfer from international partners to local suppliers in order to enhance their ability to provide goods and services to the Project."

Local content could take the following forms:

- local spend and employment in direct impact areas;
- training and mentoring of local labour to create skills transfer;
- skills development and capacity building of local suppliers and communities;
- investments in physical and institutional infrastructure (e.g. training/maintenance facilities); and
- development of long-term sustainable partnerships.

Local content will be supported as far as possible with consideration of the following:

- The use services and raw materials sourced in the Bulgaria and products manufactured in Bulgaria in so far as these services and products are available on price terms that are competitive at an international level and on terms of quality, guarantees and delivery that are likewise competitive.
- To employ in priority nationals/residents/ suppliers from the immediate zone of influence (defined as those from: the administrative area of Silistra Province of Bulgaria; to fill their unskilled labour requirements, on payment terms in accordance with local practice in Bulgaria;
- To give preference to nationals/residents of Bulgaria providing evidence of the qualifications and experience required to skilled, management and or senior management positions;
- The requirements for a transparent, ethical and internationally accepted procurement process, consistent with the requirements of international financing institutions, this will include ensuring equal access opportunities to all local supplies and communities.
- To maintain project schedule and technological conformance the Project will, from time to time, utilise sole sourcing for goods and services
- To provide reasonable assistance to regional development, assistance to local regions and seek to create new business and employment opportunities, by seeking opportunities to work with small to medium-sized suppliers.

Skills mapping in the PAC and Silistra Province to get an early understanding of job opportunities will be undertaken by the Project Company to assist the Contractor.

It is the expectations that the Contractor will seek to rely on local contractors where possible that will employ workers mainly from local communities e.g for security services, cleaning services, and unskilled civil works. A local hiring policy will be required setting out how local hiring and procurement will be undertaken by the Contractor with reference to these requirements 9as defined in section 2.16 above. Furthermore, the Project Company has committed to work with the Mayor of Silistra to identify local businesses and workers with an interest participating in the Project to set up a local database that must be referred to by the Contractor.

The number of workers on site will build up over time until peak construction activity is reached and then will start to tail-off as construction nears completion and the Project enters the commissioning phase (refer to section 2.17 for a typical manpower schedule). It is anticipated that there will be no need for a temporary workers' accommodation facility on-site but that the temporary labour workforce will be housed in Silistra or further afield. No workers will be housed in the community of P. Lambrinovo or Smilets.

Indirect employment has to be taken into consideration in this phase and this might be associated with:

- The project's supply chain (goods and services);
- Spending of project employees in local communities

The Project will generate economic opportunities linked to the demand of goods, materials and services. The Pylons and Panels will be imported and will be transported using the existing infrastructure, but it is highly likely that materials needed for civil works (i.e., cement, clay), as well as the materials needed for infrastructure improvements (i.e., for the upgrading of access tracks) will be procured locally in the pre-construction phase of the Project. Additional employment opportunities will rise for the security safeguard of the Project and to prevent H&S risks to the local population.

There is no available data from which to estimate levels of indirect employment and indirect economic opportunities generated by the Project and the impacts will depend on the nature of the local economy, the availability of required goods and services in the Project Area and ways in which employees choose to spend their earnings.

Women's income is likely to be more impacted than men in a household due to the likelyjhood that compensation of assets and crops deriving from the project will be given to the head of the household / names person on the land documentation, which does not always include the womens name. In addition, the employment of women in construction projects is typically minor compared to men, who are seen as the likely employment pool for this type of work. The project will however engage in best efforts to remove access barriers and support women access to opportunities".

Construction activities may create employment related expectations among the local population, which are unrealistic. If this is not managed appropriately, it could lead to worsened relationships between the Project and the local population once these expectations do not materialise.

Impacts of community unrest (or lack of support for the project) could occur if expatriate workers are selected to work on the project and communities consider that employment opportunities for local community members are insufficient.

Incoming workers (predominately men) are at minimal risk of human rights abuses and harassment. As such there is the potential for the Project to contribute to project related GBVH. Specific sources of risk are varied and include interactions between:

- Workers of different genders, perceived social status, and financial capital, with significant power differentials potentially existing between national and international staff or between managers and the people that report to them.
- Female workers and their family or community members who may disapprove of their employment by a project.
- Workers and local community members or in-migrants, with workers often in a position of relative financial wealth, or perceived to be in a position to access project benefits on behalf a local community member.
- Public or private security forces deployed in a project area because of a project's presence (whether paid by the project or deployed by the state) and either local community members or the project's workers.
- People and the individuals that force them to work in a project's supply chain against their will or at an age younger than the minimum age of employment in a country (or for potentially hazardous work, younger than 18 years of age).

It is also acknowledged that the interactions above represent the risk that people, usually women and girls, will be exploited, harassed, or otherwise victimized by another person. However, a project's presence in a project area can also create GBVH risks more broadly, if it brings about socio-economic changes that make GBVH more likely. Long term project induced migration that may ring anout permanent socio-ecnomic change which is often a contributor to GBVH is not anticipated for this Project.

A gender risk assessment and GBVH management plan (including survivor centric grievance mechanism) will be prepared for the Project. In addition there are a number of cross cutting mitigation measures that will also reduce GBVH risks including practive engagement as defined in the SEP, labour force management as defined in the Labour Management plans, community health and safety plan, occupational health and safety plan, accommodation management policy, and the Project code of conduct (including zero tolreace for all forms of GBVH, working under the influence of drugs and alcohol and sensitisation of the code of conduct during induction). Security providers will be vetted and VPHSR training will be provided by the Contractor to subcontractor security guards. The use of female security guards will be promoted[91].

Workers in the Project's supply chain may not receive the same working conditions as those on the Project site. Supply chain workers could be located in Bulgaria or in other countries and they

[91] Community GBVH risks are assessed in section 16.3.4 in response to temporary labour influx.

may be more vulnerable to unsafe work sites, and without direct monitoring from Project personnel, forced and child labour may be used. The Project Company implements a supply chain policy that includes measure to determine supply chain risks during procurement and monitoring risk during development.

Table 103: Impact assessment - construction phase (labour)

Economy and Employment – Provision of local workforce, goods, materials, and services– construction phase					
Type	**Duration**	**Extent**	**Frequency**	**Likelihood**	**Magnitude**
Direct	Short-term	Local and regional	Daily	Likely	Medium
Receptor					**Sensitivity**
Eligible and able people in the local communities and in the region					**Medium**
Overall Significance of Impact					
Moderate Positive					

Table 104: Impact assessment - construction phase (labour and working conditions)

Working conditions and wellbeing					
Type	**Duration**	**Extent**	**Frequency**	**Likelihood**	**Magnitude**
Direct	Short-term	Local and regional	Daily	Likely	Medium
Receptor					**Sensitivity**
Local workers, unskilled workers and supply chain workers are at risk from exploitation with regard to working hours, forced labour, overtime and working conditions.					**Medium**
Overall Significance of Impact					
Moderate Negative					

Table 105: Impact assessment - construction phase (GBVH)

Working conditions and wellbeing					
Type	**Duration**	**Extent**	**Frequency**	**Likelihood**	**Magnitude**
Direct	Short-term	Local and regional	Daily	Likely	Medium

Receptor	Sensitivity
Local community members in particular women in the community. Female employees	High
Overall Significance of Impact	
Moderate Negative	

18.4. Potential impacts during operation phase

The operation and maintenance of the OHTL will be managed by the Transmission Line Operator (ESO), to whom will be handed over after the line will be completed and commissioned. The potential impacts on economy, employment and livelihood deriving from the above actions are associated with the following impact factors:

- Demand for workforce;
- Production of energy.

Employment during this period from direct and indirect communties will be low (less than 10 personnel) and may only consist of a a few skilled workers dedicated to the operation of the PV and skilled and semi-skilled workers periodically contracted for maintenance activities and .less than five persons hired to undertake unskilled labour (such as module cleaners and security personnel) for the total duration of the PV plant operation. Workers in this phase will be, to the extent possible, hired from local communities. The Project Company will explore capacity building opportunities to workers from the PACs during the construction period.

Likewise, the need for goods, materials and services will be limited, and will essentially consists in products necessary for the periodic maintenance of the PV. The Company will prepare a strategy and implement activities to increase local procurement and to support the creation of a local supply chain that can provide products and services needed for the periodic maintenance of the PV.

Production of energy during the operation phase will lead to general benefits on Bulgaria's energy market, increasing the amount of energy available to businesses, industries and families, and decreasing the dependence on harmful sources. Works on the OHTL and the substation will introduce new infrastructures and will overall improve the power transmission network.

Table 106: Impact assessment - operation phase (labour)

Economy, Employment and Livelihood - Request for workforce, goods, materials, services and production of energy – operation phase					
Type	**Duration**	**Extent**	**Frequency**	**Likelihood**	**Magnitude**
Direct	Long-term	Local, Regional	Continuous	Likely	Low

		and National			
Receptor					**Sensitivity**
Local communities, regional and national receptors					**Medium**
Overall Significance of Impact					
Minor Positive					

18.1. Potential impacts during decommissioning phase

Potential impacts to employment associated with decommissioning phase will entail temporary to short-term work. Overall, during decommissioning, the impact will be similar to the construction phase.

18.2. Cumulative Impacts

No cumulative impacts are foreseen in relation to labour.

18.3. Management and Mitigation

The following table presents a series of mitigation and management measures identified to eliminate or reduce the impact to acceptable levels.

Table 107: Mitigation and monitoring (labour)

Phase	Mitigation and management measures (all impacts)
Design/Contract / Construction	• Require contractor (via EPC Contract) to implement a Human Resources (HR) Policy, Code of Ethics, Policy Against Bribery and Corruption, Recruiting Policy, Supply Chain (Procurement) Policy, and Communication Policy • Requirements for the Contractor and Tier 2/3 sub-contractors to demonstrate functioning HR policies aligned with Lender requirements, ILO core conventions and Bulgarian law. • Define manpower requirements for the construction and operation phase for the Contractor and subcontractors, including the number of E&S personnel and their qualifications. • Perform a supply chain due diligence or obtain third-party supply chain due diligence reports to verity potential suppliers' credentials regarding the occurrence of forced labour, child labour or occupational health and safety failures. The supply chain will be mapped (to the polysilicon level) and verified by an independent consultant for point of origin. • Suppliers shall have a system to identify and manage risks associated with child labor, forced labor, occupational health and safety and pollution prevention for their activities and their core supply chain. • Perform labour needs assessment and local housing analysis for temporary labour influx (excluding P. Lambrinovo and Smilets)

Project Specific /GIIP	The following measures required by IFC PS 2 will be implemented during the pre-construction and construction phase for the economy, employment and livelihood component: • Identify villages that will be considered "Local" (suggested villages within Silistra District) • Collaborate with the State Employment Offices; • Collaborate with local institutions (Municipality and Administrative Units) • Put in place transparent and fair recruitment procedures • Implement Worker code of conduct (including grievance mechanism) • Strictly following the Bulgarian Code of Work requirements; and • IFC PS 2 Labor and Working Conditions; • Adopt and maintain human resources policies and management systems or procedures with the requirements of PS 2 and national law. These policies and procedures will be understandable and accessible to workers, and in the main language(s) spoken by the workforce. HR policies and management will ensure: o Non-discrimination and equal opportunities to all workers; o Compliance with national laws and international standards regarding employment of minors; o Avoidance of any form of forced labour and child labour; o Provide clear and transparent information on wages, benefits and working conditions; o Provide workers with a safe and healthy work environment; o use an international workforce for a term-limited period for compliance and training purposes, where national personnel cannot be sourced. • Implement a grievance mechanism open to employee and non-employee workers. Ensure that all workers directly and indirectly employed are informed on how to submit grievances. • Develop survivor centric GBVH grievance procedure for internal implementation with links to existing third party service provides (e.g. health and justice) for dealing with worker or community GBVH matters. Establish a Grievance Redress Committee for the purpose of processing any GBVH matters confidentially. • Prepare an Accommodation Management Policy in line with the EBRD and IFC Guidance on worker accommodation. • Provide equal trainings for men and women; • In field training during the development of implementation phase, also through Contractor/s and Sub-Contractors;

	• Establish training and re-training program that specifically target women, to increase their opportunities; • Define number of persons to be interviewed for a new position which need to be women; • Clearly indicate that the position opportunity is for both men and women; • Provide a women friendly working environment. • Perform a tier 1 supply chain due diligence/obtain the third-party supply chain due diligence reports to verity potential suppliers' credentials regarding the occurrence of forced labour child labour or occupational health and safety failure. • Monitor private employment agencies (if used) for recruitment fees and ensure they are paid by employers rather than prospective job applicants.
Operation and Maintenance	• Establish Operational HR Policy • Implement Worker code of conduct (including grievance mechanism)
Decommissioning	• Same measures as in the construction phase
Enhancement	• Contractors will be contractually required to maximise use of local workforce in the Project; • Prioritize employment of members of vulnerable groups and individuals • The presence of a CLO through the construction phase will allow any future issues to be identified and addressed referring to women and vulnerable groups and individuals; • In order to increase the project's Local Content, the Company will aim to procure goods, services and materials from local businesses to the extent possible; • Ensure priority of woman owned business during the procurement process • Company will provide information on procurement, tendering, and contracting processes with a transparent and clear approach, to ensure that equal access to opportunities is guaranteed; • Information on procurement opportunities will be given to local businesses, through tailored communication with Local authorities and other appropriate parties; • Local companies identified as able to provide goods, materials and services during the strategical analysis will be contacted directly providing information on tendering opportunities.
Monitoring	• Weekly reporting of statistics for local workers, including gender-disaggregated workforce numbers in construction and operations monitoring reports.

	• Undertake labour audit for Contractor compliance against Labor Management and Working Conditions Management Plan once every two months (construction), and annually (operations) to identify any gaps in payment, provision of personal protective equipment and/or any other concerns regarding human resources to include review of working conditions, paysheets and payslips, leave allocation, and interview with workers to verify findings. • Undertake audit for Contractor compliance against EPC Worker Accommodation Management Plan monthly.

18.1. Residual Impact

The table below sets out the predicted residual impacts from inaccurate information and negative perceptions towards the Project.

Table 108: Residual Impacts (labour)

Impacts	Magnitude (pre mitigation)	Sensitivity	Magnitude (post mitigation)	Residual significance (post mitigation)
Negative – during construction (labour)	Low (positive)	Medium	Medium (positive)	Moderate (positive)
Negative – during construction (labour)	Medium	Medium	Medium (negative)	Minor (negative)
Negative – during construction (GBVH)	Medium	Medium	Major (negative)	Minor (negative)

19. ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING

19.1. Overview

An ESMP is prepared as part of the ESIA (refer to Volume III of the ESIA) to support the ongoing implementation of E&S requirements for the Project. The objectives of the ESMP are to:

- Clearly describe the required components of the Project Company and EPC Contactor and subcontractor environmental and social management systems (ESMSs) for the construction and operation phase.
- Provide overview of the Project Company structure and roles and responsibilities for implementing projects.
- Define the supporting management plans require for implementing the requirements of the ESIA.
- Confirm compliance obligations.
- Establish objectives of the ESMP (construction and operation).
- Define roles and responsibilities for implementation of the requirements of the ESMP.
- Set minimum requirements for meetings inspection, audits and reporting.
- Define key performance indicators (KPIs).

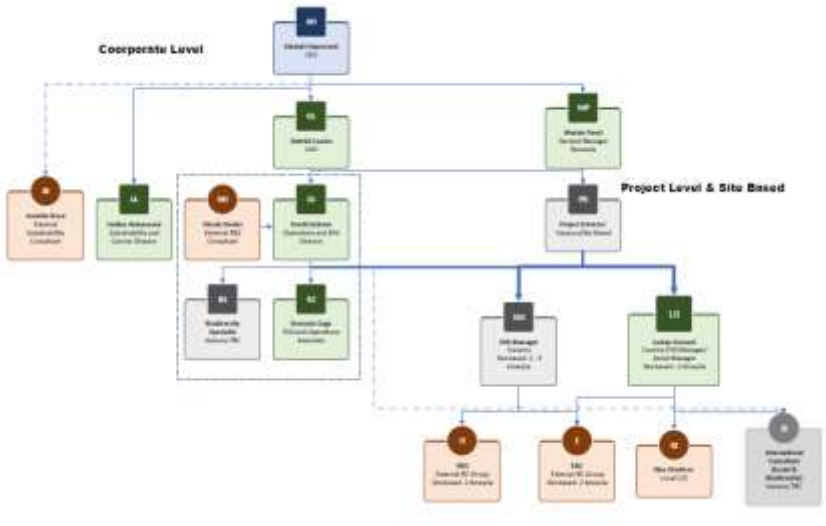
A summary of the key commitments outlined in this ESIA is provided in the ESMP. These will be elaborated in the subsequent supporting management plans to provide further information on:

- Outcomes or targets
- Timeframes
- Responsibilities
- Resources required.
- Monitoring activities

19.2. Roles and responsibilities

The key roles within the Project Company for delivering the E&S aspects of the Project are provide in Figure 95. The ESMP includes a full description of the responsibilities for these roles.

Figure 95: Project organogram



19.3. Project Company ESMS

The Project Company will adopt a Project E&S Policy and work under a construction environmental and social management system (cESMS) and operational ESMS which is aligned to (but not certified to) ISO 14001 (environmental management) and 45001 (for health and safety).

The Project Company/Contractor will adopt the following policies.

- Project Environment and Social Policy (RE-ESMS_01)
- Project Health, Safety and Security Policy (RE-ESMS_02)
- Project Labour Commitment Policy (RE_ESMS_06a)
- Project Local Content Policy (RE_ESMS_06b)
- Project Code of conduct - workers (RE_ESMS_06c)
- Project Code of conduct - security (RE_ESMS_06d
- Worker Accommodation Policy (RE_ESMS_06e)

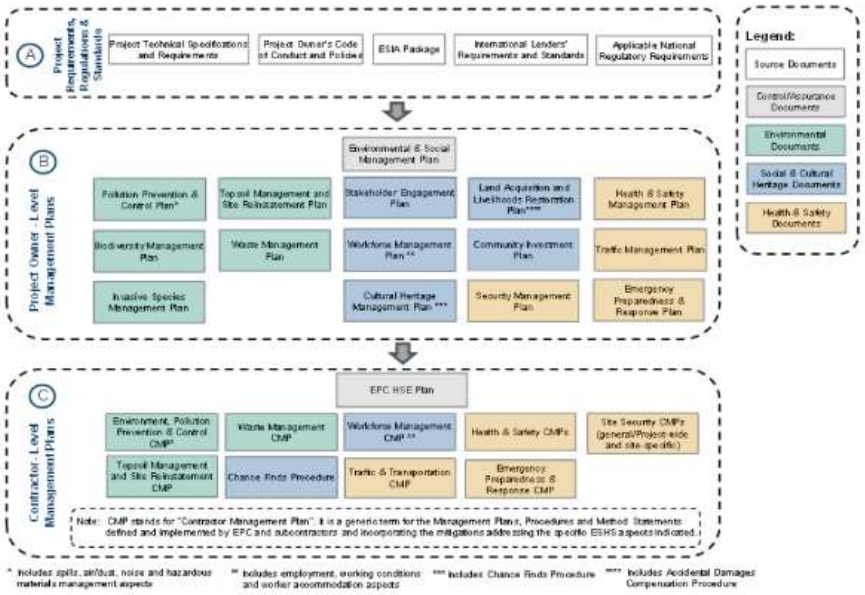
Other relevant Owner (Corporate) Policies

- Anti-bribery and corruption policy
- Code of conduct and ethics
- Contracts and Procurement Policy
- Cyber Security Policy
- Equal Opportunity and Discrimination Policy

- Health and Safety Policy for Outside the workplace and Site Visits
- Corporate Health and Safety Policy
- Personal data and Processing Policy
- Speak up Policy
- Supplier Code of Conduct

Project Management Plans (PMPs) to be prepared for the Project by the Owner and the EPC as summarised in Figure 96 below and elaborated in Table 109. Some plans will be led by the Project Company, and some will be developed by the Contractor based on Company requirements.

Figure 96: Project Management Plans



The overarching plan is the Environmental and Social Management Plan. This is supported by a series of topic specific project management plans (PMPs). The PMPs will be structured to include but will not be limited to the plans listed below and elaborated in the following table. Further information will be provided in the ESMP (Volume III).

- Construction ESMP (St_GEORGES_ESMP_00)
- Corporate social responsibility Plan (St_GEORGES_ESMP_02_CSR)
- Pollution Prevention and Control Plan (including noise, dust, Haz materials, effluent wastewater) (St_GEORGES_ESMP_03_PPCP)

- Biodiversity Management and Monitoring Plan (St_GEORGES_ESMP_04_BMMP)
- Waste Management Plan (St_GEORGES_ESMP_05_WMP)
- Labour Management Plan (St_GEORGES_ESMP_06_LMP)
- Chance finds procedure (St_GEORGES_ESMP_07_CFP)
- Stakeholder Engagement Plan (St_GEORGES_ESMP_08_SEP)
- Occupational health and safety plan (St_GEORGES_ESMP_09a_OHSMP)
- Community health and safety plan (St_GEORGES_ESMP_09b_CHSMP)
- Traffic Management Plan (St_GEORGES_ESMP_10_TMP)
- Emergency preparedness and response plan (St_GEORGES_ESMP_11)
- Contractor Management Plan (St_GEORGES_ESMP_12)

Table 109: Project Company Construction ESHS Management Plans

No.	Project ESHS Management Plan	Aspects covered
0	**Environmental and Social Management Plan**	• Project Policy and Code of Conduct • Legislative and other requirement • Roles and responsibilities • ESHS Management control (supported by Project Company topic specific management plans as defined below) • Incident and non-conformance management • ESHS reporting • Management of change • Training • Management Review • ESHS Commitments Register
2	**Corporate social responsibility Plan**	• Company values • Community values • Project initiatives • Monitoring and reporting
3	**Pollution Prevention and Control Plan including noise, dust, hazardous materials, effluent wastewater and batching plant emissions management**	• General pollution prevention and protection measures • Pollution prevention and protection measures at hazardous materials storages, such as bunding of storage areas, tank overfilling prevention measures etc. • Spill prevention containment measures around sensitive equipment, installation of appropriate spill clean-up equipment and development of response procedures • Measures at source to prevent pollutants to enter pathway • Actions to be followed in case pollutants enter the pathway

No.	Project ESHS Management Plan	Aspects covered

		• Management of spill-contaminated soil
		• Wastewater discharge and management
		• Construction dust mitigation and monitoring
		• Noise management,
		  o Noise abatement/mitigation measures
		  o Noise monitoring
		• Hazardous materials storage and handling

4	**Biodiversity Management and Monitoring Plan (including habitat restoration plan and invasive species management)**	• Plan for implementation of mitigation measures identified in the assessment of Project's impact on biodiversity. • Mitigation strategy (how the mitigation hierarchy has been followed) • Requirements for pre-construction check surveys • Management and monitoring measures during construction phase of the project • Roles and responsibilities • Measures to avoid the introduction and / or spreading of invasive alien species

5	**Waste Management Plan**	• Non-hazardous and hazardous waste management, including:
		  o Waste hierarchy implementation (i.e. reduction at source, reuse, recycling, energy recovery, responsible disposal);
		  o Identification and classification of wastes;
		  o Waste register;
		  o Waste handling (i.e. collection, segregation and containers, storage, treatment, transport and documentation, disposal);
		  o Waste duty of care process (waste transfer, waste consignment provisions);
		  o Monitoring and reporting.

6	**Workforce/labour Management Plan – and workers grievance mechanism** (including Labour Commitment Policy, Code Of Conduct For Workers & Code Of Conduct for Security Personnel)	• Training and skill development activities; • Employee grievance mechanism; • Camp and worker accommodation management aspects • Measures for fair treatment, non-discrimination, and equal opportunity in employment. • Requirements related to provision of safe and healthy working conditions, and the health of workers • Management of potential communicable diseases associated with construction workforce. • Behavioural code of conduct for workers when outside of work and for interaction with local community • Contractor employment practices conformance, reporting and monitoring

No.	Project ESHS Management Plan	Aspects covered
		• Management measures related to child labour, forced labour, third-party workers.
7	**Chance finds procedure**	• Cultural heritage responsibilities, management and works supervision during construction • Chance finds procedure • Chance finds training, management and response • Interface and coordination with relevant authorities
8	**Stakeholder Engagement Plan including community grievance mechanism**	• Stakeholder identification and mapping • Stakeholder analysis • Previous engagement activities • Stakeholder engagement plan and record keeping • Grievance mechanism • Monitoring and evaluation • Internal and external reporting • Roles and responsibilities
9a	**Occupational Health and Safety Management Plan**	• Safety principles and philosophy • H&S policies and commitments • Project H&S objectives • H&S management system structure • H&S leadership, organization, competence, communication • Contractors H&S management • PPE requirements and enforcement • Non-conformances and incident reporting, investigation and lessons learned • H&S audit & review • H&S performance monitoring/ improvement • H&S records and documents control
9b	**CHS and Security Management Plan**	• Security arrangements roles and responsibilities • Site access (project personnel identification, visitors identification vehicles identification etc.) • Security-related communication arrangements • Interface with host government agencies and public security forces • Provisions to ensure compliance with regulations and good industry practice regarding: o Security personnel selection and employment o Security personnel rules of conduct, o Security personnel training, equipment o Monitoring of compliance and investigation process of non-

No.	Project ESHS Management Plan	Aspects covered
		compliance acts • Security training program including: o Code of Conduct modules specific to security personnel o Voluntary Principles on Security and Human Rights • Grievance mechanism
10	**Traffic Management Plan**	General management plan defining common control measures, standards and procedures for construction traffic management aimed at guiding contractors on applicable construction traffic planning and management requirements. • Site access and haulage routes (for general and over-dimensioned vehicles) • Road traffic management including on-site and off-site/public roads speed limits, vehicle inspection requirements, operating rules and procedures • Dust, air emissions, noise abatement requirements and measures • Access roads management • Road-related accidents prevention • Local traffic signage • Timing of deliveries • Road's closure • Road's cleaning • Abnormal load road safety and management requirements • Communication in advance of heavy and abnormal load construction traffic through communities • Training of drivers and equipment operators • Community awareness program on traffic-related risks, in line with SEP provisions • Monitoring system • Internal monitoring and reporting • Contractor traffic and transportation management planning requirements.
11	**Emergency Preparedness and Response Plan**	Provision of a consistent and systematic approach to ensure effective control and management of emergencies that may be encountered during project development on project sites. • roles and responsibilities, chain-of-command and communication framework • decisional workflow in case of emergency • different emergency tiers response teams: • notification procedure • potential emergency scenarios and their management

No.	Project ESHS Management Plan	Aspects covered
		• media and public relations during emergency • training and drills requirements • emergency contact details
12	**Contractor Management Plan**	• Outline the process for Contractor and sub-contractor selection • Outline the regulations and requirements that contractors should adhere to • Make clear how contractors will be monitored during construction • Outline the methods for reporting what is found during monitoring • Specify the process for mobilisation and demobilisation of the construction site
13	**Livelihoods Restoration Plan**	• Livelihood restoration principles and activities • Eligibility and entitlements • Planning and implementation • Monitoring and evaluation • Accidental damages compensation process for future unforeseen impacts.

The E&S provisions and obligations in the main contract between the Project Company and Contractor / O&M contractor must be applied back-to-back down the contracting chain.

The ESMP requires an emergency preparedness and response plan to be prepared that considers natural hazard risks (e.g., flood risk, seismic risk, weather risk) in project design), climate related risk, the proximity and availability of adequate medical services and risk management and training protocols.

20. CONCLUSIONS

20.1. Key conclusions

The Project is considered to be suitable for development and able to comply with national regulatory framework and the requirements of IFC PSs and GIIP.

The project can be developed in accordance with:

- PS1 – Assessment and Management of Environmental and Social Impacts and Issues
- PS2 – Labour and Working Conditions
- PS3 – Resource Efficiency and Pollution Prevention and Control
- PS4 – Health, Safety and Security (community/workers)
- PS5 – Land Acquisition, Involuntary Resettlement; and Economic Displacement; and
- PS6 – Biodiversity Conservation and Sustainable Management of Living Natural Resources.

PS7, PS8 are not considered to be triggered.

This ESIA has identified and evaluated potential E&S impacts that the Project may have on the environment and communities within its direct and indirect AOI (positive and negative) concluded that the measures outlined in this ESIA enable the Project to avoid, or where avoidance is not possible, minimise, mitigate or compensate adverse environmental or social impacts and issues to workers, affected communities and persons, and the environment from Project activities, including biodiversity impacts to acceptable levels.

Overall, the ESIA concludes that the Project represents a priority infrastructure for Bulgaria. The Project is an effective and viable energy infrastructure project for the country. The proposed project is part of the economic and environmental policies of the European Union, having as its starting point the national and international conventions on climate change. This Project will help increase the renewable energy sector and reduce reliance on non-renewable sources.

20.2. Stakeholder engagement

The following stakeholder engagement has been undertaken in relation to the Project:

- one to one meetings with various stakeholders at the regional, district and local level
- Public perception survey (110 household surveys)
- Key informant interviews (KII) with mayor, seasonal residents, health facilities, local business and accommodation facilities.
- Focus group discussions (FGDs) with women, youths and older persons from P. Lambrinovo and Smilets.
- Open day / public meeting to disclose the draft ESIA and highlight issue and concerns of stakeholders in particular the project affected communities of Smilets and P.Lambrinovo.
- Feedback meeting

Concerns highlighted by the community during the open day and one to one meetings include:

- Timelines for the removal of demolition waste already cleared from the site and whether it contains asbestos containing materials,
- noise impact on residential receptors along the southern boundary of the project site,
- the potential for restoration of hedgerows around the periphery of the site, and
- community health and safety risks including electromagnetic fields and fire.

To date, stakeholder perception of the Project is neutral based on consultation performed during ESIA by the date of this ESIA report however there are ongoing engagement efforts to manage community perceptions and expectations. It is noted, that site clearance efforts undertaken by the previous owner leading to the unauthorised storage of site clearance and demolition waste on the outskirts of Silistra is a major issue for the community of _P.Lambrinovo and a strong expectations that the Project Company must rectify the issue before works commence. The Project Company has committed to rectify this matter and safety remove the waste to an approved location in accordance with GIP (refer to section 6.10).

A program for effective engagement going forward is set out in the Project Stakeholder Engagement Plan (SEP) alongside an already established project community grievance mechanism The CLO is already active in the local community.

20.3. Environmental

- Demolition wate already stored adjacent to the site will be removed in an appropriate manner to an approved disposal location.
- Sustainable land clearance practices and rehabilitation and restoration actions are required to ensure already disturbed areas of land are not further degraded with the potential for erosion and unnecessary loss of habitat.
- The Project may generate negative environmental impacts from the use of hazardous materials, or poor waste management, however these can be mitigated or managed to acceptable levels.
- The project infrastructure in Bulgaria is suitable for managing the construction phase and operation phase waste streams from the Project.
- The Project will have a minor impact on air quality, noise, groundwater, and water availability, cultural heritage and transportation infrastructure in the local region. These impacts can be managed to acceptable levels as defined in this ESIA

20.4. Biodiversity

- The project is not predicted to adversely impact on any national or international protected areas.
- Main site and OHLT route are deemed to be modified habitat (pre-clearance) except where there are areas of xeric grassland within the Project boundary of the main site, which is classified as

- Some species of conservation importance have been identified from the field work conducted to date. A rapid CHA has been performed that did not identify any species that trigger critical habitat criteria as outlined in IFC PS6.
- The assessment has focused on outlining project specific mitigation measures for protecting areas of high biodiversity in particular the L-S Protected Area near to the PV Site.

20.5. Labour and social

- Occupational health and safety risks will require a comprehensive construction health and safety management system and occupational health and safety plan for the Project works.
- Labour matters and supply chain matters which are crucial to the successful development of the Project will be managed by setting out key obligations on suppliers and contractors in contractual documentation.
- Local employment and procurement will be prioritised where possible. However, awareness raising will be necessary in the local communities to manage expectations of the exact number of opportunities available.
- Impacts of community unrest (or lack of support for the project) could occur if expatriate workers are selected to work on the project and communities consider that employment opportunities for local community members are insufficient.
- Temporary worker accommodation needs will be provided the Contractor or their subcontractors in the form of offsite hotels and rental accommodation in the town of Silistra and further afield. The Contractor will ensure hotel/housing standards are aligned with GIIP as defined by the EBRD and IFC Guidance on worker accommodation and any additional standards required by other Lenders. No temporary labor accommodation will be used from the village of P. Lambrinovo or Smilets.
- Community health and safety risk are determined as low however due to perception issues on certain topics, the Project will implement awareness raising activities to inform local community members of the outcomes of the findings of the ESIA with respect to EMF, fire safety concerns, emergency preparedness and GBVH.
- All workers (including security personnel) will be required to sign a workers' code of conduct that includes obligations for recognising the potential for Gender based violence and harassment (GBVH) risks exacerbated by the Project. Training on the code of conduct and GBVH will also be given in the Project induction and follow up refresher training via tool box talks.

20.6. Land

- The Project will not result in any physical displacement impacts.
- There will be some permanent and temporary land take for the Project (OHTL) that may result in minor adverse impacts on livelihoods for local farmers along the OHTL route.

- Livelihood impacts are not expected to be significant and where required, supplementary livelihood restoration measures in line with IFC Performance Standard 5 on Land Acquisition and Involuntary Resettlement (over and above the national compensation requirements) will be outlined in a Project LRP. This will address loss of access to land (temporary and permanent) and to oversee acceptability of the national compensation process for land owners and informal land users (not expected)

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Annexes

A- Scoping Table

Scoping Survey – St. George PV project January 2024				
E&S Aspect (Construction (C), Decommissioning (D) / Operation (O))	**Potential source of impact, receptors and scoping evaluation (main PV site and OHTL route, unless noted)**	**Scoped In/Out**		**Requirements for ESIA/baseline data collection**
Air quality (Construction/Decommissioning) (C/D)	Based on site observations, Air emissions sources within 250 of the PV Site boundaries or the OHTL routes include the R218 regional (adjacent to the eastern boundary of the PV Site) and warehouse facilities to the southwest of the PV site. The OHTL's routes across arable agricultural land may result in dust emissions during certain agricultural activities, e.g. ploughing. Concerning general baseline monitoring data for the region, the current air quality (AQ) near the site and OHTL is considered good (non-degraded with limited anthropogenic influence other than roads). The largest source of AQ emissions will be fugitive dust from construction vehicle movements, site preparation and general construction work and fugitive emission (NOx, SOx) from construction traffic (including delivery vehicles). The OHTL routes across agricultural fields and air quality OHT ROW is considered good.	✓		The ESIA will include a high-level qualitative assessment of construction phase AQ impacts (traffic and dust within 250 m of the proposed Project (PV and OHTL) to understand impacts on potential receptors and define GIIP for managing construction dust and fugitive emissions in the ESMP.
Air quality, dust (Operation) (O)	No operational emissions are anticipated from the Project's operation (PV/OHTL). Project-related fugitive emissions will be intermittent and slight.		✗	This topic is scoped out for further assessment in the ESIA.
Noise and Vibration (C/D)	There is potential for noise impact on workers and residents of the villages within 250m of the Site and OHTL. Noise impact will arise due to the use of plant and machinery and construction-related traffic due to works at the substations and along the OHTL route. The nearest noise-sensitive human and ecological receptors are residential properties in the village of P. Lambrinovo to the southwest of the site, which falls within 250m of the site boundary. Based on the available project information and typology of the project area, no anticipated	✓		The ESIA will consider potential noise-generating sources and impacts and perform a qualitative assessment of potential impacts to define GIP for construction noise management in a framework ESMP. The existing noise baseline at the nearest sensitive receptor locations will be ascertained to support future noise benchmarking. Noise impact will be considered for receptors within 250m of the proposed works. A qualitative assessment of the impact of construction activities will be performed. The ESIA will

Scoping Survey – St. George PV project January 2024				
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	blasting activities will occur; therefore, no noise and vibration emissions will be emitted from blasting. There is also potential for vibration impacts connected with the delivery of components to the site. The proposed piling method and construction techniques are not expected to require driven piles, resulting in excessive vibration impacts.			consider vibration impacts on nearby buildings along the delivery route along the 218 and R21 and local roads. This will be integrated into the traffic and transportation impact assessment chapter. Vibration risks from construction works are scoped out considering the unlikely need for blasting and high vibration piling techniques.
Noise and Vibration (O)	There are some minor noise sources (inverters, substation transformers) proposed in the south-west of the operational solar power plant close to the residential areas of P. Lamrinovo. Other operational noise impacts of the PV site and OHL will mainly arise from maintenance works. These will be short-term and intermittent. Abnormal or emergency noise events, if any, will be short-term and temporary. No operational vibration impacts are envisaged.	✓		The ESIA will assess the potential impacts of the noise sources in the south-west of the operational solar power plant site on sensitive receptors in P. Lamrinovo and will identify appropriate mitigation measures to minimise impacts if required.
Landscape and visual impact (C/D)	Construction activity at the PV site may constitute a visible activity (presence of construction traffic, compound, plant and equipment and localised light pollution) that may modify the landscape in which they are set. These activities will be temporary, short-term/transient, reversible activities. Potential landscape and visual impacts from these sources are therefore regarded as negligible. OHTL are typically built sequentially; therefore, from any viewpoint, the opportunity to observe activities in connection with the OHTL construction may only be evident for a few weeks. Even construction site support buildings are unlikely to be present for more than a few weeks at any location. Potential landscape and visual impacts from these sources are also		✗	No further assessment proposed.

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	considered negligible. This, combined with the general absence of receptors in the project zone of visual influence for the OHTL routes, indicates a negligible impact.			
Landscape and visual impact (O) (including glint and glare)	Generally, the height of the permanent installation of solar PV panels will be low (less than 2.5m above ground level). The LILO OHLT connections to the existing line are not considered to impact the surrounding visual receptors, considering the same voltage OHTL in the area where the OHTL will connect. In all cases, the Project proposes to use standard/sensitive material choices for the structures on site. The permanent installation of solar panels can result in glint and glare[92] on residential properties and road users within 1km of the project site. There are no airfields within 10km of the Project site. Potential receptors within the 1km buffer include residential receptors in the village of P. Lambrinovo to the southwest, R218 to the east and the local road running east-west to the south of the Project site. Considering the angle of the road and village to the south-facing panels, the significant vegetation screening around dwellings in the village, along the R218 and the local road to the south of the site, and the fact the southern road is a local road where road volumes and speeds are low (including access road options and around the panel areas), glint and glare impacts are not expected to be present and are screened out from further assessment.		✕	This topic is scoped out for further assessment in the ESIA.

[92] Glint – a momentary flash of bright light typically received by moving receptors or from moving reflectors & Glare – a continuous source of bright light typically received by static receptors or from large reflective surfaces

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Surface water quality (C/D)	The scoping site visit did not identify any surface water features on the Project site or along the planned OHTL routes. The closest surface water bodies are the southern reaches of the S-L Protected Area, about #30m from the project boundary, a small water body located in the southwest of P. Lambrinovo at approximately 600 m distance. A small surface water body is around 2.5 km northwest, and a more extensive surface water body (freshwater lake) is approximately 7 km from the Project inside a protected natural area - Srebarna. Srebarna Nature Reserve is a freshwater lake adjacent to the Danube, extending over 600 ha. There is no plan to use existing water bodies to discharge effluents. It is considered that there is minimal risk that construction works may result in an unforeseen release into the existing water bodies, however, good practice effluent management will be required.	✓		The ESIA will identify potential effluent sources from the construction phase and define GIIP construction management methods for controlling spills and unforeseen discharges. A specific impact assessment on effluent discharges and surface water quality will not be performed.
Hydrogeology (C/D)	The groundwater levels at the site are expected to be between 10m and 30m based on the groundwater borehole date from the site. Most foundations for the PV panels will be less than 10m; therefore, there is limited potential to impact groundwater due to the foundation works. Cabling (LV and MV) is typically laid in trenches less than 1m in depth and, therefore, is unlikely to impact groundwater. There is a risk of abnormal activity affecting groundwater.	✓		The EISA will qualitatively assess the potential to impact groundwater based on further geotechnical works to be performed for the Project. The ESIA will outline management and mitigation measures (GIIP and project-specific) in the ESMP framework.
Hydrogeology (O)	No groundwater will be used during the operation phase.		✕	This topic is scoped out for further assessment in the ESIA.

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Waste (C/D)	Construction-related waste (PV and OHTL) will be a mixture of inert material (soils), general/domestic construction waste and hazardous wastes (e.g. oils, paints, greases, etc.) and some biomass resulting from the levelling of the site, civil works, equipment installation (packaging, metals, paints, coatings), electrical cut-offs and domestic waste. The baseline review indicates that waste management options in the wider Project area for the transportation and disposal of waste in line with GIIP are available, including options for panel recycling.	✓		The ESIA will confirm the waste generated during the Project construction phase and collect further baseline data on the availability of waste infrastructure following GIIP for disposal. The ESIA will define in the ESMP the requirements of a Site Waste Management Plan aligned with GIIP, including requirements for waste segregation, recycling and duty of care obligations,
Waste (O)	The operational phase will include general hazardous and non-hazardous waste connected with maintenance works. One key waste stream will be waste from electric and electronic equipment (WEEE), specifically PV panels. It is anticipated that any wastes will be removed from the site area by the engineers for offsite disposal, storage or decommissioning (in the case of old/obsolete equipment) to facilities within Bulgaria.	✓		The ESIA will identify requirements for operational waste management (general waste, hazardous waste and WEEE) and define management requirements for an operational WMP plan, including a framework for supplier policies and buyback schemes. Additional baseline information on suitable options for disposing of electrical equipment and other hazardous waste in line with GIIP will be identified and outlined in the ESIA.
GHG emissions (all phases)	Since the Project is a renewable energy generation project, its operation phase emissions are considered to displace emissions that will otherwise be sourced from other electricity generation technologies[93]. During construction, the Project will not generate Scope 1 and Scope 2 emissions over 100,000 tonnes of CO_2 equivalent		✗	This topic is scoped out for further assessment in the ESIA.

[93] IFI Approach to GHG Accounting for Renewable Energy Projects (World Bank, 2015)

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	annually, construction related emissions are not deemed to be significant			
Physical climate risks (all phases)	The principal receptors for climate change risks at the Project level are the Project infrastructure and workers. The Project's location in central Europe is considered to be moderately susceptible to physical climate change risks, including (among other things) extremes of temperature, precipitation, and high winds, which may have adverse consequences on the Project in the long term. However, any weather changes (wind, temperature, rain) up to 2050 are expected to be within the design parameters of the PV Project, substation, drainage system, and the OHTL. Furthermore, the extent of the projected change in the short term (during the construction phase), where most impacts on workers may be realised, is not considered significant or assessed further.		✕	This topic is scoped out for further assessment in the ESIA.
Soils and land quality (erosion potential/ land contamination) (C/D)	Soil contamination is risky at all construction sites and industrial facilities where hazardous substances are handled and stored. Exposure to hazardous substances in the workplace puts workers at risk. Hazardous substance spills at the project site could adversely impact soils, groundwater, community health and biodiversity.	✓		The ESIA will consider the erosion susceptibility of the soils in the Project area to assess the soil structure (topsoil) to identify mitigation or enhancement measures to manage soil degradation. Specific soil and erosion management requirements and requirements for site clearance and rehabilitation/reinstatement of land aligned with GIIP will be outlined in the ESMP. No soil sampling is proposed at this time, but soil sampling is proposed as part of the broader geotechnical works to be undertaken by the Contractor, which can be used as the baseline for future monitoring or for defining mitigation measures for worker safety and disposal.

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				The ESIA will define GIIP in the ESMP for managing construction soil contamination risks.
Soils and land quality (erosion potential/land contamination) (O)	There will be no impact on the soil during the operation phase. The potential for contamination may occur during abnormal operating scenarios.		X	GIIP for managing operational contamination risks will be outlined in the ESMP. A specific operational impact assessment is scoped out from the ESIA.
Water resource use (C/D)	Water requirements during the construction phase will be principally related to cement works for foundation works and potable water use for workers. The site is connected to the municipal water supply, which will be used for the Project's potable construction water needs, or water will be tankered in. Cement is expected to be delivered to site pre-made (no on-site batching plant) from an authorised and permitted facility.		X	This topic is scoped out for further assessment in the ESIA.
Water resource use (O)	The water for cleaning and potable use will be sourced from local permitted resources/suppliers. No abstraction of groundwater or surface water resources, such as drainage/irrigation channels, will be undertaken by the Project. This includes agreements with local water supply companies and fire stations. Water will be supplied from municipal sources or through water trucks when the wet cleaning is needed (preliminary assumption: 2-4 times per year). This solution means that there will be no impacts on water resources (surface water and groundwater) during the operation phase. Operational water use requirements are expected to be negligible, given that water will not be used for routine panel cleaning, for the OHTL operational water use requirements are expected to be negligible.		X	This topic is scoped out for further assessment in the ESIA.

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Socio-economic (all phases)	The community of P. Lambrinovo and landowners along the OHTL routes are the most likely to have contact with the Project and its workforce. Other community members are located at a distance, making them unlikely to be impacted by construction nuisances. Community members may have contact with Project workers should workers be accommodated in the nearby communities (understood to be unlikely at this stage, and most workers will be located in Silistra or beyond), travel through the communities (traffic and transportation impacts are discussed further below) or visit the communities during their rest periods. However, direct and indirect AOI community members may benefit from the Project through employment or providing goods and services.	✓		A socio-economic survey will be undertaken as part of the ESIA to identify Project impacts and benefits and any groups vulnerable to project impacts (e.g. grazing herders). The ESIA will also include an assessment of accommodation options in local communities. The ESIA will include consultations with local communities and their representatives to identify possible risks and inform the ESIA. Outputs will be outlined in the ESMP, including preparing a worker code of conduct.
Labour and working conditions (including labour risks in the supply chain) (C/D)	There have been allegations of forced labour in the solar panel supply chains, particularly in the mining of polysilicon and manufacturing in some areas of the World. Additionally, there are general concerns with labour and working conditions in the construction industry (PV and OHTL), particularly for migrant workers. Some areas that need to be addressed are retention of passports, payment of workers (particularly overtime payments), and provision of adequate accommodation (where relevant).	✓		The ESIA will determine the risk of forced labour in the supply chain and child labour in the construction phase (secondary data and consultations). The ESIA will identify requirements for managing and monitoring workers on-site and accommodation facilities. Due diligence of the supply chain is outside the scope of this ESIA but may be performed separately depending on the final sourcing location.
Labour and working conditions (O)	Labour and working conditions are less of a concern during operations, given that workers are usually higher skilled and better paid. However, there continue to be risks, particularly with the most vulnerable workers, such as security guards and	✓		The ESIA will identify labour and working condition risks and requirements for the operation phase and outline management and monitoring requirements in the ESMP.

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	cleaning staff. For OHTL, O&M works will be the responsibility of the network operator.			For the OHTL operator, the ESIA will define GIIP requirements for human resources (HR) policies and labour monitoring to be undertaken during the operations phase that may be adopted by the network operator if not already in place.
Occupational Health and Safety (all phases)	Occupational health and safety are a risk for all Projects; some possible occupational health and safety concerns related to the Project include slips, trips and falls; electrocution; falls from heights' working in enclosed spaces; and weather extremes. Given the distance from the project site to local communities, access to medical care in the case of an emergency will need to be carefully discussed.	✓		The ESIA will consider OHS risks and the provision of medical care and outline management and monitoring requirements in the ESMP.
Electromagnetic field (EMF) and electrostatic impacts (OHTL only) (Construction and decomissioning)	There is no possibility of EMF impacts associated with the Project's construction phase since the electrical equipment will not be energised at this stage.			This topic is scoped out for further assessment in the ESIA.
Electromagnetic field (EMF) and electrostatic impacts (OHTL only) (operation)	The maximum magnetic field is produced directly under the conductors, with a maximum magnetic field produced by an overhead line occurring directly under the conductors at mid-span (at the lowest ground clearance) when the line is operating at its highest current. Typical EMF levels are generally accepted to reduce to background levels within 25meters of high voltage OHTL. Although there are no permanent receptors within 25m of the OHTLs, thisis socped in so as to confirm no impacts.	✓		This topic is scoped in for assessment in the ESIA.

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Community, health, safety and security (communicable diseases, public access, GBV/H.)	The closest communities are located adjacent to the PV site and within 1km of the OHTL route; therefore, there may be some impacts on the local community members due to the presence of a construction labour force and security teams. Given the relatively small size and short-term duration of the expected workforce, significant impacts are not expected; however, any increase in the number of people in such small communities will make an impact. There is a possibility that workers may be housed either in temporary accommodation at the project site or existing accommodation within nearby communities, the latter of which represents a greater community safety risk.	✓		The ESIA will identify project requirements for accommodation and assess the risk concerning local communities. The assessment will also determine whether worker influx is a concern and if an influx management plan will be required. The ESIA will recommend that a Security Plan be prepared to require that security guards are provided with training on interactions with communities and signage with pictures and in all relevant languages should be posted around construction and operations facilities. The ESIA will consider the preparation of a worker code of conduct. It will also recommend a preference for local recruitment.
Livelihoods, land use and economic displacement	There are private and government landowners connected with the main PV site, and multiple landowners (more than 70 PAPs) associated wit the OHTL routes. It is necessary to confirm the land acquisition and servitude process fo r te main PV site and OHLT was undertaken in accordance with PS5, and to confirm land use and permanent and temporary economic displacement impacts. Further consultations are required to determine if there will be any resettlement impacts.	✓		The ESIA process will include consultations, focus groups and socioeconomic surveys as well as specific surveys with landowners. A Livelihood Restoration Plan and Grievance Mechanism (GM) is required to outline provisions for livelihood restoration aligned with PS5.