Qair

FIRST DRAFT

SCOPING REPORT

SOLAR POWER PLANT RUDINE 50MW, NIKSIC

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Document Revision History

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Contents

1. Introduction

1.1. Project overview

Qair Montenegro d.o.o. (the Client) is developing the Solar Power Plant (SPP) Rudine, with a total installed capacity of 46.55 MW in the Municipality of Nikšić, Montenegro. The project area is located approximately 20 km south-east of the city of Nikšić, within cadastral municipality KO Rudine, covering approximately 74.8 hectares of land.

The PV plant will be connected to the national transmission network through an existing 110 kV overhead transmission line, situated in close proximity to the project area. To enable secure and reliable evacuation of generated electricity, the reconstruction of an approximately 10 km long section of the 110 kV overhead transmission line (OHL) between Rudine and the Vilusi 110/35 kV substation is planned.

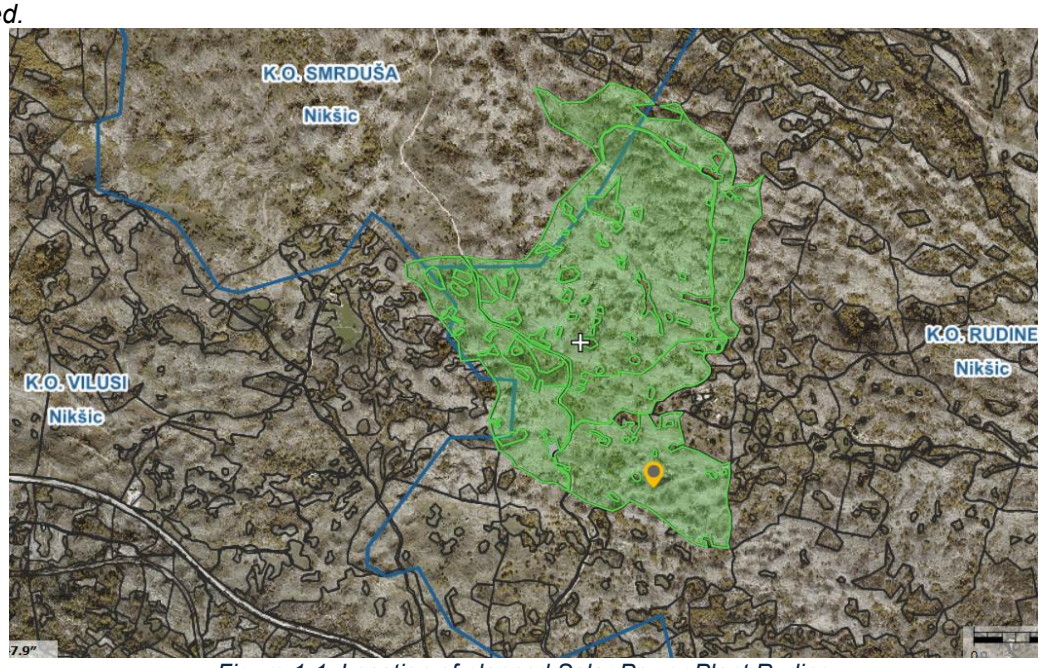

Figure 1-1: Location of planned Solar Power Plant Rudine

The reconstruction will generally follow the existing alignment of the transmission line corridor (see Figure 1-2), which crosses the rural karst landscape between Rudine and Vilusi, parallel to the M6 main road. The works will include replacement of towers and conductors, and potential adjustments to tower foundations to meet current technical standards and grid requirements. The exact connection point and technical details will be defined in the Main Design, which is currently under preparation.

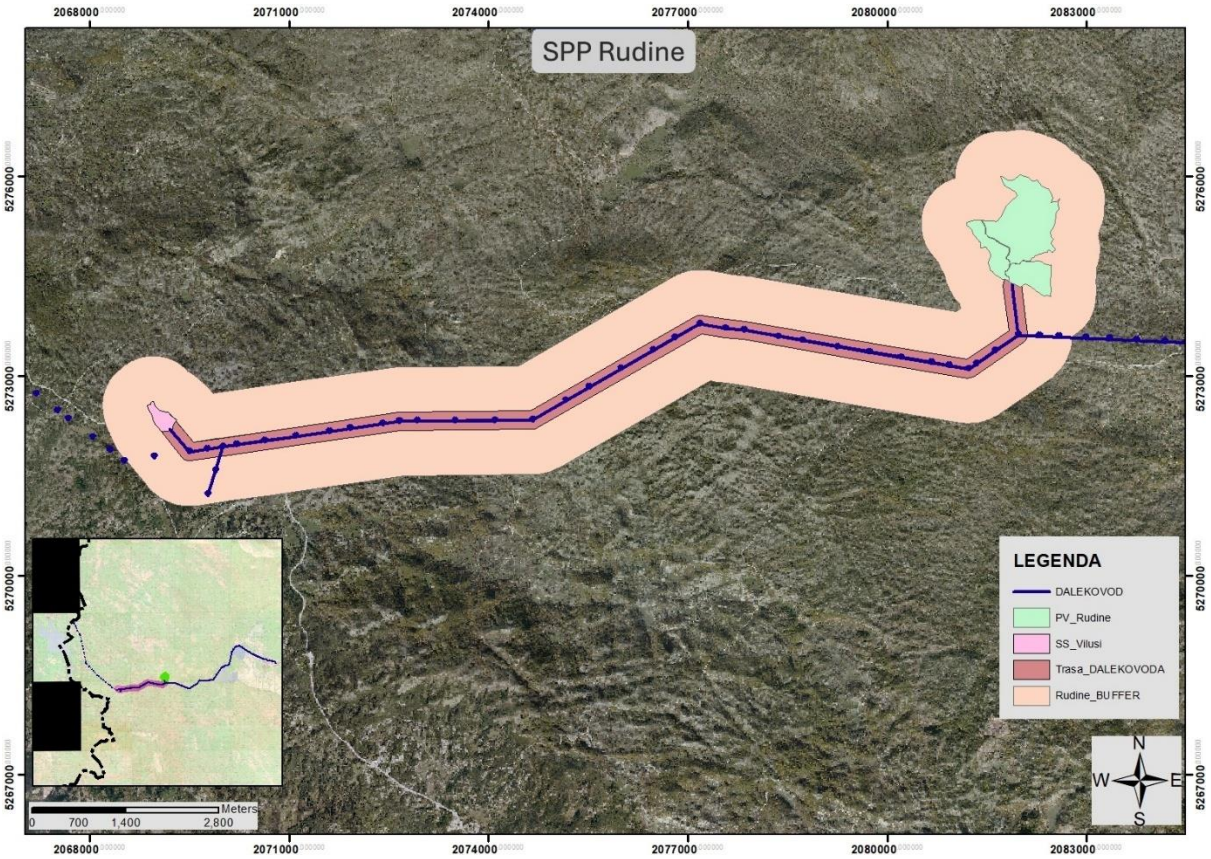

Figure 1-2: Location of SE Rudine a existing OHL 100kV Niksic-Bileca

The project comprises the following main components:

- *Solar Photovoltaic Plant with an installed capacity of 49.875 MWp, including PV modules, inverters, internal cabling, and ancillary infrastructure.*
- *Internal Infrastructure, including access roads, fencing, drainage system, control building, and maintenance areas.*
- *Connection Infrastructure, consisting of a reconstructed 110 kV OHL (approx. 10 km) from Rudine to the TS Vilusi substation.*
- *Grid Connection, enabling the integration of the generated electricity into the Montenegrin transmission system operated by CGES (Montenegrin Transmission System Operator).*

The reconstruction of this line is planned within the CGES Transmission Network Development Plan for the period 2023–2032, which provides the strategic and technical framework for upgrading and reinforcing key sections of the national grid.

In addition to the reconstruction works, the project investor Qair will construct:

- *A new 110 kV overhead line of approximately 500 m in length, connecting the Rudine Solar PV Plant to the existing 110 kV Nikšić–Bileća line; and*
- *A new 110 kV overhead line of approximately 500 m in length, connecting the same 110 kV line to the Vilusi substation.*

The implementation of the project will involve construction activities both at the PV plant site and along the OHL route. These activities will include civil works, installation of PV modules and electrical equipment, tower and conductor replacement along the existing line corridor, and commissioning activities.

The project area is located approximately 15 km southwest of the town of Nikšić, within a sparsely

populated karst plateau. The nearest settlements are scattered rural households in the Rudine area and along the M6 road corridor towards Vilusi.

The primary objectives of the Rudine Project are to:

Generate renewable electricity in Montenegro, thus contributing to the national strategy for increasing the share of renewable energy sources (RES) and reducing greenhouse gas (GHG) emissions.

Support regional electricity supply and contribute to the implementation of Montenegro's National Energy and Climate Plan (NECP) and the Green Agenda for the Western Balkans.

Reduce reliance on fossil fuel-based electricity generation and support Montenegro's commitments under the Energy Community Treaty and the Paris Agreement.

This Scoping Report and the subsequent ESIA are prepared in compliance with Montenegrin national legislation, as well as EBRD Environmental and Social Policy (2024) and Performance Requirements (PR1–PR10), following international best practice.

1.2. The Project's Environmental and Social Impact Assessment (ESIA) Process

1.2.1. Introduction

The overall approach to ESIA will comply with Montenegrin environmental regulations and will be carried out in line with the Performance Requirements of the EBRD (2024).

The first step in the ESIA process is to assess potential project location alternatives. One alternative was assessed for the project components with the aim to select a technically feasible solution with the least environmental, socioeconomic and cultural heritage impacts. Once the preferred alternative were identified, the Consultant commenced the Scoping process with the aim to define the required scope for the ESIA. This report presents the findings of the scoping process based on the available information.

With regard to stakeholder engagement, what has taken place so far is described and analysed. Stakeholder engagement is further foreseen in the framework of Scoping Disclosure and will continue through- out the Project life cycle.

The ESIA process follows a staged approach:

- ✓ *Screening – confirmation that the project requires an ESIA, based on Montenegrin EIA legislation and EBRD categorisation.*
- ✓ *Scoping – identification of potentially significant environmental and social issues, definition of the Area of Influence (AoI), and agreement on Terms of Reference for specialist studies.*
- ✓ *Baseline Studies – collection of environmental and socio-economic data to establish the current conditions of the project area.*
- ✓ *Impact Assessment and Mitigation – prediction and evaluation of changes compared to the baseline, definition of mitigation measures according to the mitigation hierarchy (avoid, minimise, restore, offset).*
- ✓ *Environmental and Social Management Plans (ESMP) – preparation of framework and sub-plans to ensure that mitigation measures are effectively implemented.*
- ✓ *Stakeholder Engagement and Disclosure – meaningful consultation with affected and interested stakeholders, in line with Montenegrin law, Aarhus Convention, and EBRD PR10.*

Table 1-1: Summary of the ESIA process

Steps	Description
Screening	*Screening is performed to determine if the project requires a detailed ESIA*
Constraints Mapping and Alternatives Assessment	*Assessment of alternatives with the aim to identify the project alternative with the least environmental and social impacts.*
Scoping	*Scoping identifies the key issues to be addressed in the ESIA. Scoping, as presented in this report, will ensure that the process is focused on the potentially significant environmental and social impacts which may arise from the project. Ultimately scoping defines the scope of work of the ESIA, including stakeholder engagement.*
Baseline Studies	*For the key issues identified in scoping, available information on the existing environmental and social conditions (also referred to as baseline conditions) will be gathered. Secondary sources of information will be complemented by field studies and surveys where necessary. The future development of the baseline conditions in the absence of the project will also be considered.*
Impact assessment and mitigation measures	*This stage is focused on predicting environmental and social changes from the baseline as a result of the project's activities (considering the entire lifecycle of the project). Each impact will be evaluated to determine its significance for the environment and society. Where necessary measures will be proposed to mitigate significant impacts.*
Environmental and social management plans	*The various mitigation measures will be presented in an Environmental and Social Management Plan (ESMP), describing how measures will be implemented throughout the different project phases. The ESMP will de- tail the resources and responsibilities for implementation, the timing and monitoring and audit plans to ensure all the mitigation commitments are met. It will also identify any requirements for training and other capacity building.*
Stakeholder Engagement and consultation	*During ESIA preparation, The Consultant will seek the views of interested parties so that these can be taken into account in the assessment and reflected in the proposals for mitigation. Once complete, the ESIA Report will be subject to public disclosure and consultation. Comments will be taken into account in revising the final ESIA Report and ESMMP.*

1.2.2. Approach to Scoping

The Scoping Report and related stakeholder engagement activities have been planned to ensure full compliance with Montenegrin law, EU directives, and EBRD Performance Requirements. The scoping process aims to:

- ✓ *Identify and assess potential environmental and social issues, both adverse and beneficial, associated with the project.*
- ✓ *Define measures to avoid, minimise, mitigate or offset adverse impacts on workers, communities, and the environment.*
- ✓ *Identify opportunities to enhance environmental and social performance.*
- ✓ *Identify people or communities that could be affected by the project, as well as other interested parties.*
- ✓ *Ensure meaningful engagement and consultation with stakeholders on issues that could affect them.*

- ✓ *Maintain a constructive relationship with stakeholders throughout all project phases.*

Scoping is therefore both a technical process (identifying key issues, receptors, and risks) and a communication process (ensuring transparency and early disclosure).

1.2.3. Scoping Report Structure

The remainder of this report is structured as follows:

Chapter 2 – Regulatory Framework: *Overview of Montenegrin environmental and social legislation, international treaties, and EBRD Performance Requirements.*

Chapter 3 – Project Alternatives: *Summary of the alternatives considered (site, technology, layout, no-project scenario).*

Chapter 4 – Project Description: *Physical and technical details of the PV plant, substation, and connection line.*

Chapter 5 – Baseline Conditions: *Overview of environmental, socio-economic, and cultural heritage baseline conditions.*

Chapter 6 – Potential Impacts and Mitigation Measures: *Summary of potential environmental and social impacts and preliminary mitigation approaches.*

Chapter 7 – Terms of Reference for ESIA: *Proposed objectives, steps, and specialist studies for the ESIA.*

Chapter 8 – Stakeholder Engagement: *Activities conducted so far and planned engagement during the Scoping and ESIA phases.*

2. Regulatory Framework and standards

2.1. EU Alignment

Montenegro has been engaged in a continuous process of approximation to the EU acquis in the field of environment and climate change as part of its EU accession negotiations. Negotiations on Chapter 27 – Environment and Climate Change were officially opened on 10 December 2018, with the adoption of a Common Position by the EU, which included eight Closing Benchmarks to be fulfilled before the chapter can be provisionally closed.

Over the past decade, Montenegro has gradually transposed a number of EU directives into its national legislation. The Law on Environmental Impact Assessment (OG 75/18) introduced procedures for screening, scoping, EIA study preparation, public consultation, and decision-making in line with the EIA Directive (2011/92/EU as amended by 2014/52/EU). Progress has also been achieved in the fields of waste management, air quality, and industrial emissions. Further alignment and implementation efforts are ongoing for several horizontal directives, including the Environmental Crime Directive (2008/99/EC) and the Environmental Liability Directive (2004/35/EC).

A particularly important element of Chapter 27 is the establishment of the ecological network in line with the Habitats Directive (92/43/EEC) and the Birds Directive (2009/147/EC). The Environmental Protection Agency (EPA) is responsible for preparing proposals for ecological network areas, including their boundaries, target habitats and species, and management responsibilities. Significant progress has been achieved: by early 2025, approximately 76% of Montenegro's land territory and 10% of its marine territory had been mapped in accordance with Natura 2000 requirements. This represents a major step forward in preparing for the official designation of Natura 2000 sites upon accession, supported by several EU-funded IPA projects. To strengthen this framework further, the drafting of a

new Law on Nature Protection is ongoing in 2025, aiming to fully align national legislation with EU directives on habitats, birds, and ecological networks.

In the field of climate change, Montenegro has been a Party to the UNFCCC since 2006, accepted the Kyoto Protocol in 2007, and ratified the Paris Agreement in 2017. The country submitted its Second Nationally Determined Contribution (NDC) in 2021, committing to reduce greenhouse gas (GHG) emissions by 35% by 2030 compared to 1990 levels. The adoption of the Law on Climate Change (2023) established the legal framework for climate policy, including monitoring, reporting and verification (MRV), adaptation measures, and preparations for emissions trading (ETS) alignment.

According to the European Commission's 2024 Country Report for Montenegro, the country is moderately prepared in Chapter 27. While progress has been made, the report highlights the need to further intensify efforts to fulfil the closing benchmarks, particularly through stronger implementation and enforcement of environmental legislation, enhanced waste and water management, and effective nature protection and climate policies. The Commission also underlines the importance of strengthening administrative capacity, including recruitment and training of technical staff, improved institutional coordination, and provision of stable financing. As a positive example, the report notes Montenegro's successful integration of the Operational Center 112 into the EU Civil Protection Mechanism's CECIS system (February 2024), which demonstrates effective progress in the field of civil protection.

2.2. Key National Policies and Legislation Relevant to EIA

The national legislation in Montenegro that provides a framework for obtaining relevant permits and approval needed for carrying out infrastructure projects[1] (construction permit, operational permit) prescribes carrying out environmental impact assessment for project in List I of the Decree on the project, for which environmental impact assessment is mandatory ("Official Gazette of Montenegro", No. 20/2007, 47/2013, 53/2014, 37/2018), and Decision on the need for environmental impact assessment for project in List II. The main law that outlines the environmental impact assessment is the Law on Environmental Impact Assessment (EIA) ("Official Gazette of Montenegro", No. 75/18.)

Within the ongoing process of harmonisation of the national legislation with EU acquis, the amendments of the Law on EIA fully transposed the Directive of the European Parliament and of the Council 2014/52/EU amending the Directive 2011/92/EU on the environmental impact assessment of certain public and private projects. Following further actions in the accession process, the EIA process in Montenegro will follow changes in the EU legislation and implement relevant amendments when and where applicable.

Developing an Environmental Impact Assessment (EIA) in accordance with the Law on EIA and obtaining approval from the relevant National Authority – Environmental Protection Agency of Montenegro (EPA) is a time-consuming process, which requires at least 9-12 months. This process includes the receipt of the decision for EIA development, field work, drafting of the EIA, publication of the EIA for public access, organisation of a public hearing, comments submission/review of the draft EIA, submission of the EIA for approval and receipt of the approval.

The national legislation prescribes that the EIA report to be produced and submitted for approval of the EPA shall be prepared in Montenegrin language.

The Law on Environment *("Official Gazette of Montenegro", No. 52/16) defines the basic principles and instruments to be used to protect the environment, including sustainable development and public participation in environmental matters.*

The environmental legal framework within Montenegro also contains laws (and secondary legislation) covering areas summarised below, some of which are aligned with the European Directives and regulations (as indicated):

Law on Environmental Impact Assessment *("Official Gazette of Montenegro", No. 75/18) regulates the manner and procedure of impact assessment for projects that may have a significant impact on the*

[1] *The Law on Spatial Planning and Construction of Objects, ("Official Gazette of Montenegro", no. 064/17, 044/18, 063/18, 11/19 and 82/20)*

environment, preparation and evaluation of studies on environmental impact assessment and other issues of importance for environmental impact assessment.

Law on Nature Protection *("Official Gazette of Montenegro", No. 54/16. 18/19) regulates the conditions and manner of protection and preservation of nature. Nature protection is implemented for:*

- *preservation and improvement of biological (genetic, species, ecosystem), geological and regional diversity;*
- *preservation and improvement of individual natural resources;*
- *determining and monitoring the state of nature;*
- *harmonisation of human activities, economic and social development plans, programs and projects with the sustainable use of renewable and rational use of non-renewable natural values and resources, in order to preserve them permanently;*
- *prevention of activities with harmful effects on nature that are a consequence of the linear dependence of economic growth and the use of natural resources;*
- *protection and preservation of transboundary valuable parts of nature and protected natural assets;*
- *preservation of natural soil properties, preservation of water quality, quantity and availability, including sea water quality.*

Law on Industrial Emissions *("Official Gazette of Montenegro", No. 17/19) regulates measures for the prevention and control of emissions from industrial plants, which may have negative effects on human health, the environment or material goods and other issues of relevance to integrated prevention and control of environmental pollution.*

The **Law on Biocidal Products** *(OG MNE", no. 54/16) as well as the* **Law on Chemicals (***"OG MNE", no. 51/17) were adopted in order to provide an upgrade and improvement of the policy in the field of chemicals management and further harmonisation with REACH and other EU regulations in the field of chemicals. The government has adopted the National Strategy for Chemicals Management with an Action Plan 2019-2022 and the National Plan for the Implementation of the Stockholm Convention with the Action Plan 2019-2023 in order to ensure adequate management of chemicals, from production or import to disposal, in the period 2019-2022.*

Law on Protection from Noise in the Environment *("Official Gazette of Montenegro", No. 28/11, 1/14 and 2/18) determines measures for the prevention or reduction of the harmful impact of noise in the environment and other issues of importance for the protection of the environment and human health from the effects of noise.*

Law on National Parks *("Official Gazette of Montenegro", no. 28/14) stipulates that the resources of national parks: land, forests, water, plant and animal world and other natural resources, as well as the work of created values in national parks, can be used in accordance with the law, the spatial plan of special purpose and the management plan, taking into account the preservation of biological and peripheral diversity.*

The Law on Waste Management *(Official Gazette of Montenegro, 34/2024 from 12.04.2024) defines that waste management is performed in accordance with the National Waste Management Plan and Local Municipal Waste Management Plans. Pursuant to the provisions of the Law, the local self-government unit is obliged to review the implementation of the local waste management plan at the Assembly of the local self-government unit once a year.*

The Law on Integrated Pollution Prevention and Control *(Official Gazette of Montenegro, No. 80/05, 54/09, 40/11, 42/15, 54/16 and 55/18) - the control of industrial pollution is largely regulated by the Law on the Environment and the Law on Integrated Prevention and Control of Environmental Pollution, which were adopted in 2005 and have been applied since 1 January 2008, as well as by-laws adopted on their basis. The Law on Integrated Prevention and Control of Environmental Pollution regulates the conditions and procedure for issuing integrated permits for facilities and activities that may have negative impacts on human health, the environment or material goods, types of activities and facilities, supervision and other issues of importance for prevention and control of environmental pollution.*

Activities that pose a risk to human health and the environment are defined by the **Law on Responsibility for Environmental Damage** *("Official Gazette of Montenegro" No. 27/14). The*

principle of "polluter pays" is the basic principle of this law. The law stipulates that although the damage to the environment has not yet occurred, but there is an imminent threat, the operator is obliged to take the necessary preventive measures without delay to prevent it. In cases where damage has occurred, remediation measures are taken.

The **Energy Law** *(Official Gazette of Montenegro, No. 05/16, 051/17 and newest amendments of June 2020) - this Law determines energy activities and regulates the conditions and manner of their performance for the purpose of quality and safe supply of energy to end-customers; public services and other activities in the field of energy of interest to Montenegro; the manner of organising and functioning of the electricity and gas market; manner and conditions of using renewable energy sources and cogeneration; energy efficiency in the energy production, transmission and distribution sector, as well as other issues of importance for energy. This Law shall not apply to activities related to exploration and exploitation of coal, oil and gas, development, production or refining of crude oil or gas, as well as to energy efficiency in final energy consumption.*

The **Law on Air Protection** *(Official Gazette of Montenegro, 025/10, 040/11, 043/15) - This law regulates the manner of air quality monitoring, protection measures, assessment and quality improvement, air quality planning and management. Air, as a natural value of general interest, is part of the environment and has special protection in Montenegro. Protection of air from pollution by radioactive substances, genetically modified organisms, noise and natural disasters are governed by special regulations.*

The Law on Protection against Non-Ionizing Radiation *("Official Gazette of Montenegro", no. 35/13): This law regulates the protection of human life and health, persons working with non-ionizing radiation sources, and protection of the environment from the harmful effects of non-ionizing radiation, conditions for using non-ionizing radiation sources and other issues of importance related to non-ionizing radiation.*

The Law on Expropriation *("Official Gazette of Montenegro", No. 5/00, 12/02, 28/06, 21/08, 30/17, the Law on the Amendments of the Law on Expropriation, No. 75/18) defines that expropriation may be carried out for the needs of the state, municipality, state funds and state-owned companies which, in accordance with the law, perform activities of public interest. Fair compensation for expropriated real estate may be determined in cash or by ownership or co-ownership of other appropriate real estate. If the public interest for the expropriation of real estate is not determined by a special law, the public interest may be determined by the Government of Montenegro, based on a special study, in accordance with the law.*

The proposal for determining the public interest on expropriation shall be submitted by an entity, which, according to the provisions of this Law, may be a beneficiary of expropriation.

The **Law on Waters** *(Official Gazette of Montenegro, No. 027/07, 073/10, 032/11, 047/11, 048/15, 052/16, 84/2018) - this law regulates the legal status and manner of integrated water, water and coastal water management, land and water facilities, conditions and manner of performing water activities and other issues of importance for management of waters and water resources. Funds for financing water management activities are provided in accordance with a special law. This Law applies to: surface and groundwater and mixed waters of river mouths flowing into the sea; mineral and thermal waters; water resource; drinking water deposits in the territorial seas; protection of coastal sea waters from land-based pollution. This law does not apply to the use of mineral and thermal waters for the production of mineral raw materials or geothermal energy.*

Law on Protection of Cultural Heritage *("Official Gazette of Montenegro", no. 049/10, 040/11, 44/17 and 018/19) is also one of the laws to be considered when road or other linear infrastructure is planned or constructed. In the case of finding an archaeological site, the works have to be stopped and the competent body notified about the findings. There is a separate law on protection of cultural-historical area of Kotor (2013), which requires that spatial planning documentation, which foresees building of infrastructural and other objects over 3000 m^2, has to contain the study on visual impact on cultural and historical values. The Law on Protection of the Natural and Cultural-Historic Region of Kotor makes provisions for the establishment of the Council for Management of the Kotor Region, with the role of coordinating conservation, preservation and management of the property.*

Protection against the negative effects of climate change, reduction of greenhouse gas emissions,

protection of the ozone layer and other issues related to protection against the negative effects of climate change are regulated by the **Law on Protection against the Negative Effects of Climate Change** *(Official Gazette of Montenegro 73/19).*

Law on Occupational Health and Safety („Official Gazette of Montenegro", no. 34/14, 44/18) *defines that the employer is obliged to ensure protective measures by preventing, removing and controlling the risk at work, informing and training employees, along with appropriate organization and the necessary resources. Bearing in mind the changing work environment, the employer is obliged to implement safety measures and select such working and production methods that will ensure improved or higher levels of OHS. While assigning an employee to a position with special working conditions or with increased risk, the employer must take into account such employee's abilities, which may affect his/her safety and health. In accordance with the Law on Occupational Health and Safety, the employer is obliged to provide employee trainings for safe operation, at the time of concluding employment, assigning him or her to another position, introducing new technology, introducing new or replacing the existing equipment, making changes in work processes and re-assigning him or her to work after absence of more than one year. Additionally, the employer must inform an employee or employee's representative, in writing, about: the risks related to health and safety at work, protective measures and activities related to each type of workplace and/or job, the manner of organization and provision of first aid, fire-fighting, evacuation procedure for employees in cases of serious and immediate danger and the persons responsible for implementing these measures.*

The Spatial plan for Coastal zone until 2030 *ensures formal and planned basis for the sustainable development of the area. This document provides for organising and arranging this valuable space as a Coastal zone of Montenegro until 2030. The plan delivers recommendations, guidelines and projections for development of the forestry, agriculture and rural area.*

National Strategy for Coastal Zone Management until 2030 *provides integration of spatial, protective and development solutions as well as improves the system of space management and encourages strengthening of co-ordination mechanisms, builds results-oriented management practices and introduces systematic monitoring of coastal processes. The strategy provides a strengthened system to contribute to the preservation of the integrity of ecologically valuable habitats and ecosystems of coastal areas, landscapes and cultural assets.*

2.3. EIA Methodology as per National Legislation

According to the **Law on Environmental Impact Assessment** *("Official Gazette of Montenegro", No. 75/18), the competent authority responsible for conducting the impact assessment process is the Environmental Protection Agency (EPA), a state administration body in charge of environmental protection - for projects, for which approvals, permits and licenses are issued by other state administration bodies. The analysis of the project impacts in its early planning phase was carried out in the framework of the SEIA study (2018.)*

Obtaining an Environmental Permit via the approval of an EIA is necessary for projects classified as List I according to the Law on the Environmental Impact Assessment and the Regulation on Projects that are Subject of Environmental Impact Assessment ("Official Gazette of Montenegro", no. 20/2007, 47/2013, 53/2014, 37/2018), under which in Section 3 "Energy Production", projects are listed: (a) Power generation plants; and in Section 4 "Transmission lines, with or without associated facilities", projects are listed: (b) Cable and overhead power lines of 220 kV or greater with the length exceeding 15 km. For projects classified as List II, such as the proposed Project (construction and operation of 110 kV OHL of less than 15 km, construction and extension of 110 kV substations), a decision has to be made whether an EIA is needed.

The country's highest legal act – **the Constitution**, *the membership in international treaties and the ongoing national EU accession process, oblige to observing highest democratic and international standards. In this regard, the national legal system defines public participation through various legal acts and sources, through different concepts including access to information, public participation in decision making and legal protection of these rights.*

The main laws and international treaties in Montenegro that are relevant to the Project and contain provisions and principles related to public participation and access to information are: the Aarhus Convention[2], Law on Free Access to information[3], Law on Environment[4], Law on the Environmental Impact Assessment (EIA)[5], Law on the Strategic Environmental Impact Assessment (SEA)[6], Law on Spatial Planning and Construction of Structures[7] and Law on Expropriation[8].

The umbrella law for environmental protection in Montenegro is the Law on Environment, which defines the basic principles and instruments to be used to protect the environment, including sustainable development and public participation in environmental matters.

Public participation and stakeholder engagement instrument in Montenegro is part of development and adoption process of national and local strategies and plans, legislation, permitting, as well as developing SEAs, actions/intervention specific EIAs and expropriation process. The competent authority leading the process or coordinating the project implementation is responsible for public consultation process. Local governments are supporting and co-leading the process where local plans and/or projects are main subject.

Implementation of infrastructure projects prescribes carrying out environmental impact assessment for projects for which environmental impact assessment is mandatory (List I of the Regulation[9]) and Decision on the need for environmental impact assessment for projects in List II. According to the Law on EIA, the competent authority responsible for conducting the impact assessment process is the Agency for Nature protection and Environment (Montenegro EPA), a state administration body in charge of environmental protection - for projects, for which approvals, permits and licenses are issued by other state administration bodies.

The primary national legislation governing the construction and permitting process of the Project is the **Law on Construction of Facilities***. This Law defines the requirements for constructing complex infrastructure, explicitly including OHLs and outlines the responsibilities of investors, designers, contractors and engineering supervisors regarding technical documentation and construction permitting.*

The main law that outlines the environmental impact assessment is the Law on Environmental Impact Assessment (EIA). Developing EIA in accordance with the Law on EIA and obtaining approval from the relevant National Authority – Agency for Nature and Environmental Protection of Montenegro (Montenegro EPA), is legally binding and lengthy process which requires at least 9-12 months, including receiving the Decision for EIA development, field work, development of the draft EIA, publishing the EIA for public access and public hearing, organising public hearing, comments submission/review of the draft EIA, submission of the EIA for approval, receiving approval.

Therefore, projects/programs use the EIA and SEA process as the main instrument for engaging the public and fostering public participation.

The EIA process in Montenegro is carried out as shown in Figure 2-1: EIA process stages in Montenegro below.

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2 *Law on Ratification of the Convention on Access to Information, Public Participation in Decision-Making and the Right to Legal Protection in Environmental Matters (Law on Ratification of the Aarhus Convention) ("Official Gazette of Montenegro - International Agreements", No. 03 / 09)*

3 *Law on Free Access to information ("Official Gazette of Montenegro", No. 44/12, 30/17)*

4 *Law on Environment ("Official Gazette of Montenegro", No. 52/16)*

5 *The Law on EIA ("Official Gazette of Montenegro", No. 75/18) - harmonised with the EIA Directive 85/337/EEC (amended by Directive 97/11/EC and 2003/35/EC)*

6 *The Law on Strategic Environmental Assessment (Law on SEA) ("Official Gazette of the Government of Montenegro" No. 80/05, 73/10, 40/11, 59/11 and 52/16)*

7 *The Law on Spatial Planning and Construction of Structures, ("Official Gazette of Montenegro", No. 064/17, 044/18, 063/18, 11/19 and 82/20)*

8 *Law on Expropriation ("Official Gazette of Montenegro", No. 5/00, 12/02, 28/06, 21/08, 30/17, the Law on the Amendments of the Law on Expropriation, No. 75/18).*

9 *Regulation on projects that are subject of Environmental Impact Assessment ("Official Gazette of Montenegro", No. 20/2007, 47/2013, 53/2014, 37/2018, 019/19)*

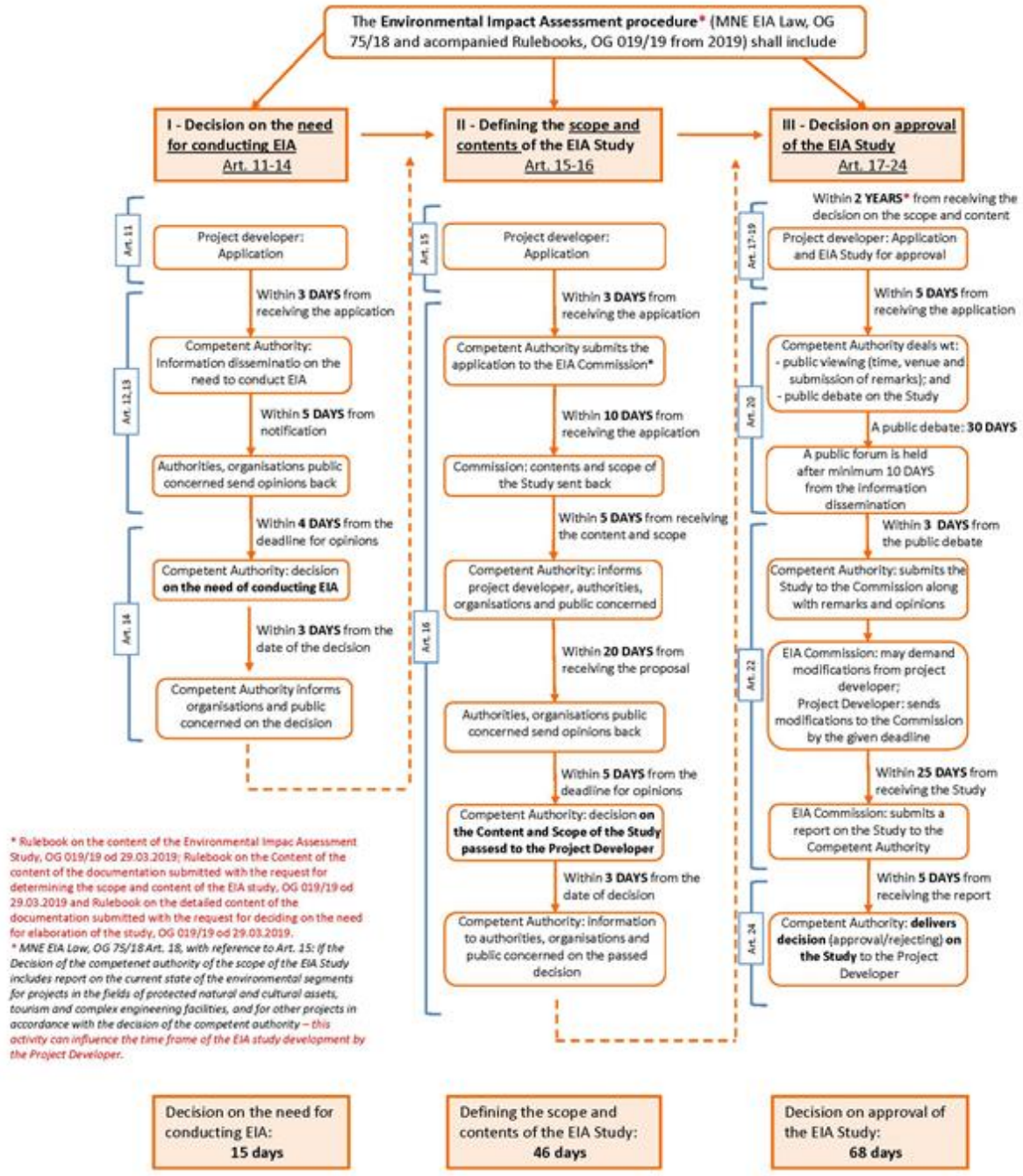

Figure 2-1: EIA process stages in Montenegro[10]

The first phase of EIA process is the process of deciding on the need for conducting an EIA for the projects in List II.

- *The process begins by submitting an application for the decision to be taken by the relevant state or local authority. The project proponent submits an application for deciding on the need for assessment of impacts to the competent authority.*
- *Enclosed to the application, the project proponent submits the following documentation: description of the project site, description of the project, description of likely significant impacts of the project on the environment, proposition of appropriate mitigation measures along with an environmental monitoring plan.*
- *After the submission, the application has being reviewed deciding on the need for impact*

[10] *Authors: Mr Aleksandar Duborija and Ms Srna Sudar*

assessment. The competent authority verifies whether the required documentation was enclosed with the application and, if not, it is returned to be amended and a period within which it must be submitted is determined.

- *Verification of the application is followed by a Notification. The competent authority informs all the bodies and organisations and the public concerned about the submitted application to decide on the need of impact assessment, within five days after receiving the complete application.*
- *Concerned bodies, organisations and the public interested in the project may deliver their comments to the competent authority regarding the submitted application within seven days upon receipt or publication.*
- *The competent authority, within seven days from the date of expiry of the deadline, decides on the need for an environmental impact assessment. Prior to the final decision, the competent authority is obliged to consider the delivered opinions. In addition, the right to appeal is provided at this stage.*

The second phase of the EIA procedure involves determining the scope and content of the Environmental Impact Assessment (EIA Scoping).

- *The project proponent submits an application for determining the scope and content of the EIA. The following documentation is enclosed with the application: general information; site description; project description; description of considered alternatives; description of the segments of the environment; description of the likely significant impacts of the project on the environment; description of measures envisaged to prevent, reduce or mitigate significant adverse environmental impacts; summary information, information about possible difficulties encountered by the project proponent in data collection and documentation; a completed questionnaire to determine the scope and content of the EIA.*
- *This is followed by the decision of the competent authority – Montenegro EPA, which verifies whether all the required documentation was submitted. A properly submitted application will be delivered, within three days, to the Commission for Impact Assessment by the competent authority. The Commission considers the application and delivers to the competent authority, within 10 days upon receipt, a report containing a proposed scope and content of the EIA.*
- *The competent authority delivers the proposal of the Commission to the project proponent and notifies interested bodies, organisations and the public accordingly within seven days upon receipt of the proposal. Interested bodies, organisations and the public concerned may, within 5 days upon receipt of the proposal from the Commission, submit their comments to the competent authority. The competent authority, within 8 days of the deadline for submission of opinions, decides on the scope and content of the EIA. Prior to the decision, the competent authority shall consider the opinions of interested bodies and organizations and the public.*
- *An appeal against the decision on the scope and content of the Environmental Impact Assessment, issued by the competent local authorities, may be lodged to the Chief Administrator.*

The second phase of the EIA procedure is not legally binding so that it can be skipped and moved on directly to the third stage.

The EIA study can be prepared by a legal person or an entrepreneur who is registered in an appropriate register for performing planning and engineering activities and development of studies and analyses. There must be a multi-disciplinary team composed of qualified personnel to prepare a study.

The third stage involves deciding on the EIA.

- *The project proponent submits an application, accompanied by the EIA to the competent authority.*
- *Upon the submission of the EIA by the proponent, the competent body delivers it for a public consultation for a minimal required period of 30 days.*
- *The competent authority, within five days from the day of central public hearing, submits the EIA to the Commission for Environmental Impact Assessment, enclosed with an overview of comments and opinions provided during the public consultation and public hearing. The Commission for*

Environmental Impact Assessment may require the project proponent to make certain amendments to the submitted EIA. The project proponent is required to act upon the request of the Commission for Environmental Impact Assessment and submit an amended EIA within the deadline set by the Commission.

- *The Commission for Environmental Impact Assessment is required to submit the EIA with a proposed decision to the competent authority within 25 days upon the receipt of documentation. The time given by the Commission to the project proponent to amend the EIA is not included into the period that was given to the Commission to decide on the EIA evaluation.*
- *Based on the report and the proposed decision of the Commission for Environmental Impact Assessment, the competent authority decides on either approving or rejecting the EIA. The decision is made by the competent authority and submitted to the project proponent within five days upon receipt of the report and the proposed decision of the Commission for Environmental Impact Assessment. The competent authority is obliged to notify the concerned bodies, organisations and the public of the decision within five days*
- *Against the decision of the Commission for Environmental Impact Assessment, issued by the competent local authority, an appeal may be lodged to the Chief Administrator.*
- *An EIA approval ceases to be valid if the project proponent fails to obtain a permit or authorisation to carry out the project within two years from the date of decision on approval. The project proponent is required to implement all the measures envisaged in the EIA for which an approval was granted.*
- *The procedures for notifying the public are also determined by national legislation. When pursuant to this law the competent authority is obliged to notify the public. The notification is carried through at least one local daily newspaper published in an area that will be impacted by the planned project, as well as through electronic media. The concerned authorities and organisations are notified by the competent authority by mail, fax and electronically.*

The EIA for the SPP Rudine was prepared by the Consultant and submitted for official approval. EPA approved the EIA by issuing the Decree of approval on 19.12.2024. The EIA was disclosed via a public debate in Niksic Municipality, as per the provisions of national legislation.

2.4. International Treaties and Conventions

Montenegro is a signatory to a number of international environment and social related treaties, conventions, declarations and protocols. The following are the most relevant:

- *UN Framework Convention on Climate Change (UNFCCC);*
- *Kyoto Protocol;*
- *Paris Agreement;*
- *Energy Community Treaty;*
- *Energy Charter Treaty;*
- *Convention on Biological Diversity;*
- *Cartagena Protocol to the Convention on Biological Diversity;*
- *Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention);*
- *Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention);*
- *Ramsar Convention on the Protection of Wetlands;*
- *Convention Concerning the Protection of the World Cultural and Natural Heritage;*
- *European Landscape Convention;*
- *Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES Convention);*
- *Protocol on Areas of Special Protection and Biodiversity of the Mediterranean;*
- *Agreement on the Protection of Bats in Europe (EUROBATS);*
- *Agreement on the Protection of African-Eurasian Migratory Waterbirds (AEWA).*

2.5. Specific Legislation on Biodiversity Conservation

Biodiversity is a subject to international conventions regulating its protection, the most important of them being the Convention on Biological Diversity (CBD), the Bern Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention), and the Convention on the Conservation of Migratory Species of Wild Animals (CMS or Bonn Convention). Montenegro has ratified and implemented all of them.

CBD regulates general aspects of biodiversity conservation, whilst the remaining two focus on species and their habitats. Animal species are classified in two appendices by the Bern Convention: Appendix II (Strictly Protected Fauna Species) and Appendix III (Protected Fauna Species). Strictly Protected Flora Species are listed in Appendix I. Meanwhile, the Convention on Migratory Species (CMS) lists species in two appendices: Appendix I (endangered migratory species) and Appendix II (species which have an unfavourable conservation status and which require international agreements for their conservation and management). CMS also has special implementation instruments – international agreements, two of them being relevant here: Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA), and Agreement on the Conservation of Populations of European Bats (EUROBATS). Montenegro has ratified both. In addition, the Rulebook on protection measures and manner of maintaining crossings for wild animals (OG MNE 80/2010) determines the protection measures and the manner of maintaining special technical and technological solutions, which ensure the smooth and safe crossing of wild animals. All bats in Montenegro are protected by law and are in the List of Protected Rare and Endangered Species (Official Gazette of Montenegro, No. 76/06).

In the European Union (EU), bird protection is regulated by the Directive on the Conservation of Wild Birds (Official Journal of the European Union [2009/147/EC]), or the Birds Directive, and bat protection by the Directive on the conservation of natural habitats and of wild fauna and flora (Official Journal of the European Union [1992/43/EEC]), known as the Habitats Directive. All European wild bird species are protected by the Birds Directive, whilst 194 species and sub-species considered particularly threatened and listed in Annex I are the subject of special conservation measures, and Special Protection Areas (SPAs) for their conservation, as well as for all migratory bird species, are designated; all SPAs are included in the Natura 2000 ecological network, set up under the Habitats Directive. All other European plant and animal species are listed in Annex IV of the Habitats Directive – species of community interest in need of strict protection, and in Annex II – species of community interest, conservation of which requires the designation of Special Areas of Conservation (SACs), whilst Annex I lists habitat types of community interest, conservation of which requires the designation of SACs. SACs, together with SPAs, constitute Natura 2000 ecological network. These two directives are also EU implementation mechanisms for the Bern Convention and the CMS.

Being EU candidate country, Montenegro has to fully transpose and implement the EU legislation (acquis communautaire) by the time of accession. Montenegrin legislation in the relevant areas has already been fully harmonised and mostly implemented. Impact of power lines on birds has been recognised by relevant international institutions and conventions, which have produced guidance documents on the subject, the most relevant being BirdLife International's report prepared for the Bern Convention and the Council of Europe (Haas et al. 2003) and CMS/AEWA guidelines (Prinsen et al. comp. 2012).

In Montenegro, the Law on Nature Protection (Official Gazette of Montenegro", No. 54/16. 18/19) regulates the protection of bird and bat species, while the Decision on protection of certain species of flora and fauna (OG RCG No. 76/06) lists strictly protected and protected wild species. .This law also governs the designation of protected areas, with individual bylaws regulating the proclamation and regulation of specific sites. The same law also prescribes the establishment of the Ecological Network of Montenegro, further regulated by the Rulebook on detailed criteria for determining the area of the ecological network ("Official Gazette" No. 45/17), which is to become a part of the European network of Natura 2000 sites (SPAs and SACs) at the accession of Montenegro to the EU.

Also, the Law on Nature Protection specifically prescribes that pylons and technical components of medium-voltage and high-voltage power lines must be constructed in a way that will prevent birds and bats from electric shock and mechanical injuries (Article 87 and 117).

2.6. EBRD requirement

The Rudine Solar Power Plant project will be financed by the European Bank for Reconstruction and Development (EBRD). In line with the EBRD Environmental and Social Policy (ESP, 2024), projects are categorised (A, B, C, FI) based on their potential environmental and social impacts.

- *Category A projects are those likely to have significant adverse environmental and/or social impacts that are diverse, irreversible, or unprecedented, and therefore require a full ESIA.*
- *Category B projects, such as the Rudine Solar Power Plant, are those with potential adverse environmental and social impacts that are site-specific, limited in scale, and readily mitigated through standard measures. For these projects, the scope of environmental and social assessment is narrower than for Category A, but still proportionate to the risks and impacts identified.*
- *Category C projects are likely to have minimal or no adverse environmental and social impacts.*
- *FI applies to financial intermediary operations.*

According to the EBRD Environmental and Social Policy (2024), the proposed development is characterised as Category B – projects with E&S impacts that are site-specific and which can be readily assessed and mitigated. For Category B projects, an ESIA is required, the scope and the depth of which will need to be decided in consultation with the competent authority.

The Rudine project falls under Category B, because:

- *It is located outside designated or proposed protected areas, with no expected transboundary impacts.*
- *No new OHL is envisaged; however, the project includes reconstruction of an existing 110 kV overhead transmission line approximately 10 km in length, to enable connection to the Vilusi substation. The reconstruction will follow the existing alignment.*
- *The project footprint is moderate (approx. 74.8 ha for the PV plant) and impacts are localised (land take, visual change, biodiversity disturbance, construction nuisance).*
- *Identified risks — such as dust, noise, traffic, biodiversity impacts and temporary restrictions on land use — are site-specific and can be effectively managed through established good international practice and mitigation measures.*
- *No involuntary resettlement is anticipated. Only temporary restrictions on road use and land access may occur during construction activities.*

Therefore, a **proportionate ESIA** *will be prepared, focusing on:*

- *Biodiversity surveys and impact assessment (birds, flora, mammals, reptiles…).*
- *Landscape and visual impacts.*
- *Construction-related nuisances (dust, noise, traffic).*
- *Community health and safety.*
- *Land use and livelihoods (grazing, farming).*
- *Cultural heritage (chance finds).*
- *Cumulative impacts with other renewable projects in the region.*

In accordance with the EBRD Environmental and Social Policy from 2024, all projects are required to meet a set of ten Performance Requirements (PRs), which establish the framework for the identification, assessment and management of environmental and social risks and impacts; the relevance of each PR to the Rudine Solar Power Plant is outlined in the following sections:

PR1 – Assessment and Management of Environmental and Social Risks and Impacts

PR1 is the cornerstone of the EBRD's environmental and social framework. It requires clients to identify, assess, and manage environmental and social risks and impacts throughout the project life cycle. For Rudine SPP, this means carrying out a proportionate Environmental and Social Impact Assessment (ESIA) that focuses on site-specific issues such as land take, biodiversity disturbance, landscape and

visual change, and construction-related nuisances (dust, noise, traffic). An Environmental and Social Management Plan (ESMP) with topic-specific sub-plans will be developed to ensure that identified mitigation measures are implemented and monitored effectively.

PR2 – Labour and Working Conditions

This requirement ensures the protection of workers' rights and the promotion of safe and fair working conditions. It covers issues such as non-discrimination, equal opportunity, prohibition of child and forced labour, and occupational health and safety (OHS). For Rudine, PR2 is particularly relevant during the construction phase, when contractors will employ temporary workers. The project will adopt Labour Management Procedures (LMP), provide OHS training, and establish a grievance mechanism accessible to all workers.

PR3 – Resource Efficiency and Pollution Prevention and Control

PR3 promotes the sustainable use of resources and the prevention or reduction of pollution. For Rudine, this includes efficient use of land and water (especially water needed for panel washing), controlling dust and noise emissions during construction, and managing waste streams responsibly. Special attention will be given to the future decommissioning phase and the end-of-life management of PV modules, which must follow circular economy principles and EU Waste Electrical and Electronic Equipment (WEEE) standards.

PR4 – Health, Safety and Security

This requirement addresses potential risks to communities that may arise from project activities. For Rudine, relevant issues include traffic safety on local roads during construction, dust and noise impacts on nearby households, and potential glint and glare effects from PV modules. Measures will include a Traffic Management Plan, dust suppression, noise controls, and glint/glare modelling. If security staff are engaged for site protection, they will be trained to operate in line with human rights principles.

PR5 – Land Acquisition, Restrictions on Land Use and Involuntary Resettlement

PR5 aims to avoid or minimise physical and economic displacement. The Rudine project is not expected to cause resettlement, but there may be restrictions on land use, especially for grazing or farming activities. In such cases, the project will apply fair and transparent agreements, and if livelihoods are affected, measures will be developed to restore them, in consultation with affected land users.

PR6 – Biodiversity Conservation and Sustainable Management of Living Natural Resources

PR6 requires clients to protect and conserve biodiversity and maintain ecosystem services. Although Rudine is located outside designated protected areas, the site includes natural and semi-natural habitats that may host protected flora, birds, bats, reptiles, and invertebrates. Seasonal biodiversity surveys will be undertaken to assess potential impacts. Mitigation measures may include habitat buffers, timing restrictions on works, and monitoring of key species. If critical habitats were to be identified, additional measures would be required in line with the mitigation hierarchy.

PR7 – Indigenous Peoples

PR7 protects the rights of Indigenous Peoples. It is not applicable in Montenegro, as there are no groups meeting the EBRD definition of Indigenous Peoples.

PR8 – Cultural Heritage

PR8 requires the protection of tangible and intangible cultural heritage. While no known cultural heritage sites are located directly within the Rudine footprint, there is always a chance of encountering archaeological artefacts during earthworks. Therefore, a Chance Finds Procedure will be prepared and implemented. In addition, consultation with the Cultural Heritage Administration will be conducted to confirm the absence of significant assets within or near the project area.

PR9 – Financial Intermediaries

PR9 applies to financial intermediary operations (e.g. banks or funds on-lending EBRD resources). As Rudine is a direct investment project, PR9 is not relevant.

PR10 – Information Disclosure and Stakeholder Engagement

PR10 requires meaningful stakeholder engagement throughout the project cycle. For Rudine, this includes early disclosure of project information, scoping consultations with local communities and authorities, and continuous dialogue during construction and operation. Special attention will be given to vulnerable groups to ensure inclusive participation. A project-level Grievance Redress Mechanism (GRM) will be established to receive and respond to concerns from workers and communities.

3. Description of Project Alternatives

3.1. Introduction

In line with the EU EIA Directive (2014/52/EU) and the EBRD Environmental and Social Policy, the assessment of reasonable alternatives is a mandatory component of the ESIA process. This section outlines the alternatives that have been considered for the Rudine Solar Power Plant project, including strategic options, site location, technological configurations, and the "no project" alternative. The analysis of alternatives provides the basis for selecting the preferred project design, ensuring that environmental and social impacts are minimised while maximising benefits in terms of renewable energy generation and contribution to Montenegro's energy and climate targets.

3.2. Strategic Alternatives (Energy Options)

Montenegro's energy sector remains heavily dependent on the Pljevlja lignite-fired thermal power plant, which accounted for around 43% of national GHG emissions from power generation in 2022 (EPA, 2024). The recently drafted Low-Carbon Development Strategy (LCDS, 2025), aligned with the NECP and the EU Green Deal objectives, identifies the retirement of TPP Pljevlja by 2041 and a massive expansion of renewable energy, particularly solar and wind, as key measures for achieving climate neutrality by 2050.

In this context, the development of large-scale solar PV plants, such as Rudine, represents a strategic alternative to continued reliance on coal and fossil fuels. Compared to fossil generation, solar PV offers:

- ✓ *Zero direct GHG emissions during operation,*
- ✓ *Reduced air pollution and health impacts,*
- ✓ *Alignment with Montenegro's NDC commitment (35% GHG reduction by 2030 compared to 1990),*
- ✓ *Consistency with the LCDS scenario, which projects solar to become the dominant generation technology by 2035.*

Alternative renewable sources such as hydropower and wind energy are also part of Montenegro's decarbonisation pathway, but both have greater environmental and social constraints: large hydropower is associated with biodiversity and resettlement concerns, while wind farms may have higher impacts on birds and bats. In comparison, solar PV projects like Rudine are considered more compatible with Montenegro's decarbonisation trajectory, offering a balanced trade-off between technical feasibility, environmental impacts, and economic viability.

3.3. Location Alternatives

The selection of the Rudine site (approx. 74.8 ha in cadastral municipality KO Rudine, Municipality of Nikšić) was based on a combination of technical, environmental, and socio-economic criteria. When considering alternative locations for a solar power plant of comparable capacity in Montenegro, several factors were taken into account:

Solar irradiation potential – *the site offers high solar exposure, consistent with national solar potential maps. In the case of Rudine, the key parameter used as an indicator of natural solar potential is the* **Global Horizontal Irradiation (GHI)**, *expressed in kWh/m² per day. Areas with GHI below* **3 kWh/m²/day** *were excluded from consideration due to low economic potential. An analysis of GHI data for the Municipality of Nikšić shows that on* **99% of its territory the irradiation level exceeds this minimum threshold**. *The subsequent suitability map for solar development in Nikšić (see Figure 3-1) was prepared by overlaying binary datasets of GHI and land-use/environmental constraints at a resolution of 28×28 m. The total area suitable for solar development in the municipality is estimated at* **465.4 km²**. *Assuming that approximately* **2 ha of land are required per 1 MW of solar capacity**, *the theoretical solar potential of the municipality is* **23.27 GW**.

Proximity to transmission infrastructure – *the location allows for efficient connection to the 110 kV transmission network with limited new linear infrastructure.*

Land availability and use – *the area consists largely of rocky karst terrain with shallow soils and limited agricultural productivity, which reduces the risk of significant impacts on fertile land or displacement of high-value economic activities.*

Avoidance of sensitive receptors – *the site is located at a sufficient distance from settlements, cultural heritage sites, and protected areas.*

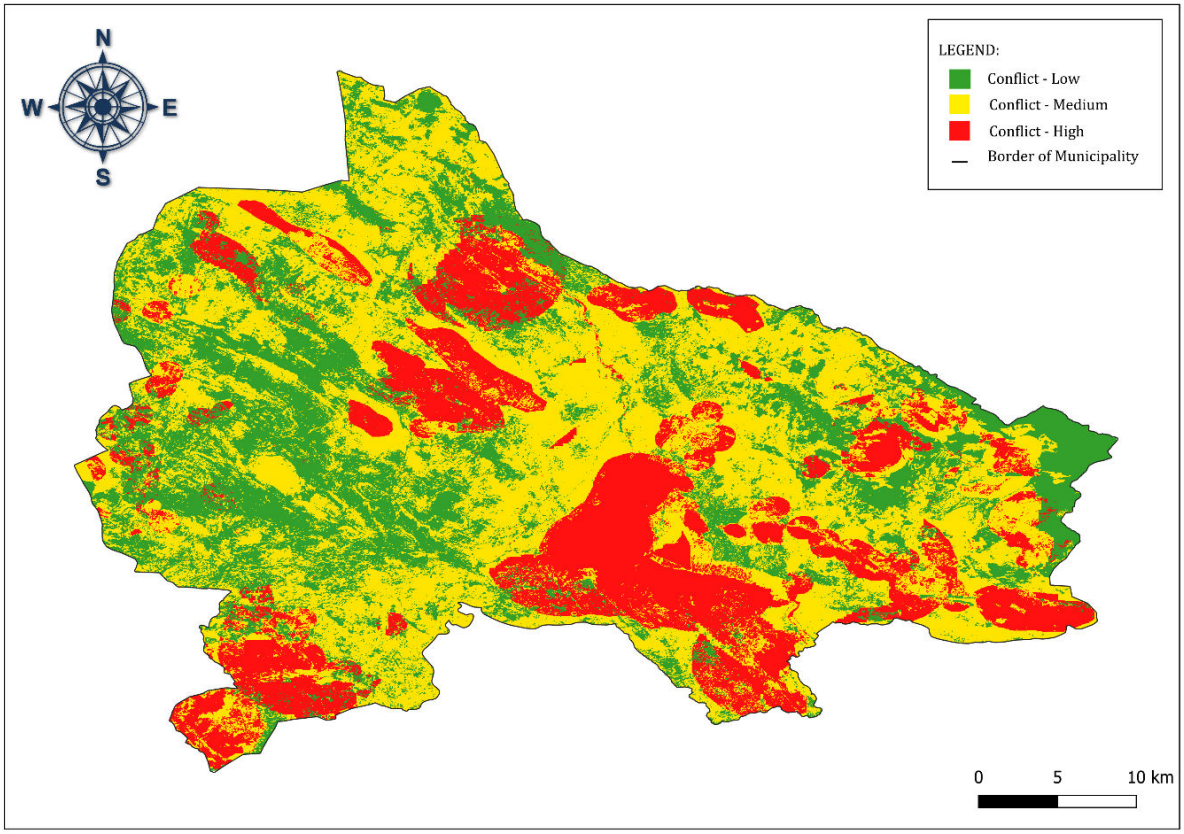

Figure 3-1: Conflict maps[11]

[11] *Božidar Pavlović, Irma Muhović, Biljana Medenica, Dražen Karadaglić (2024). Mapping of Solar*

Importantly, according to the **map prepared by The Nature Conservancy (TNC)**, *which identified areas of higher and lower conflict potential for renewable energy development in Montenegro, the Rudine location falls within a* **zone of lowest conflict**.

The following map presents the location of the planned Rudine Solar Power Plant in relation to the solar conflict map for Niksic and as can be seen, the location of the planned Rudine Solar Power Plant does not fall within any conflict zone. On the contrary, by overlaying the maps it is concluded that the project site lies within the green zone.

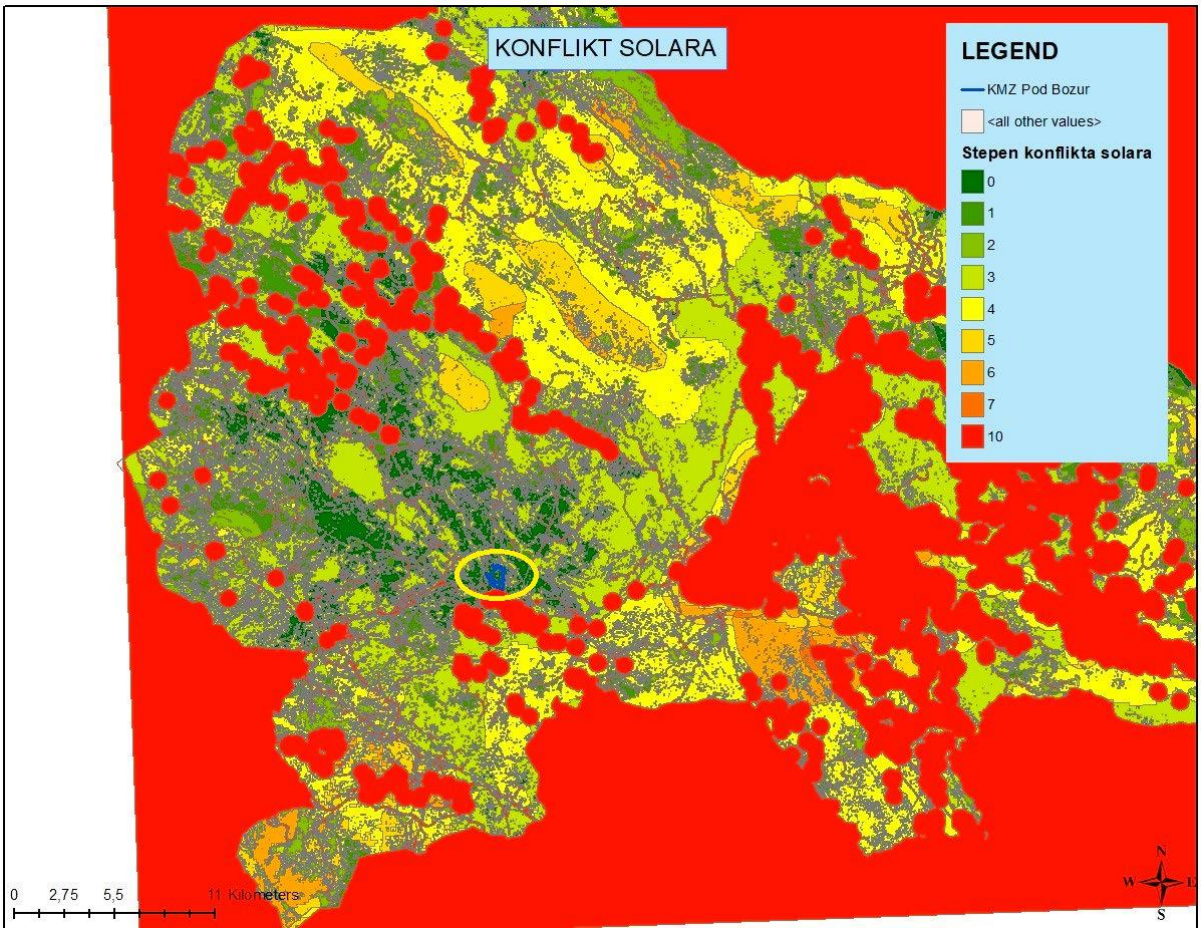

Figure 3-2: Location of the planned Rudine Solar Power Plant on the solar conflict map

This independent assessment confirms that the site is among the more suitable areas in the country for solar PV development, balancing renewable energy expansion with the protection of biodiversity and socio-economic values.

While alternative sites were considered during the initial screening process, most were associated with either greater distance from the grid, higher agricultural value, or proximity to sensitive ecological areas.

Based on this comparative analysis, the Rudine site was selected as the preferred location, as it presents the **lowest overall level of environmental and social conflict** *while meeting the technical requirements for a 46.55 MW solar power plant.*

and Wind Potential in the Municipality of Nikšić

3.4. Technological Alternatives

When planning the Rudine Solar Power Plant, several technological alternatives were considered, in line with best practice and technical-economic feasibility assessments.

PV module technology. *Two types of modules were assessed: conventional monofacial modules and bifacial modules. Monofacial modules convert solar radiation only from the front side, whereas bifacial modules capture reflected radiation from both front and rear sides, thus increasing yield, especially on high-albedo surfaces such as rocky or light-coloured terrain. Considering the site characteristics and the potential to optimise generation, bifacial* **Jinko Tiger Neo N-type modules** *with a nominal power of 625 Wp were selected, or equivalent, with minimum power of 600 Wp. This option maximises annual electricity production while maintaining competitive costs.*

Mounting system. *A comparison was made between fixed-tilt mounting structures and single-axis trackers. Trackers can increase energy yield by following the sun's movement throughout the day, but they involve higher investment and O&M costs, require more complex foundations, and may have greater landscape impact. Also, a comparation was made between commonly used materials for solar panels mounting structures: aluminium and steel. Each material has its unique attributes. Aluminium is popular material. It is lightweight which makes aluminium structures easy to handle and install. Aluminium is commonly utilized in the construction of roof and ground mount system. Steel offers a significant advantage in terms of strength and material consumption compared to aluminium for large-scale solar power plants. For Rudine, given the karstic terrain and the need to balance costs, efficiency, and environmental considerations, the selected solution is fixed-tilt steel profiles anchored on concrete foundations. This provides structural stability, lower visual prominence, and easier maintenance.*

Inverter technology. *Both central inverters and string inverters were considered. Central inverters are cost-efficient for large-scale projects but may reduce system flexibility and increase the risk of partial generation losses. String inverters allow modularity, easier maintenance, and better adaptability to potential shading or module failures. For Rudine, the selected option is a distributed inverter system with* **133 Sungrow SG350HX string inverters** *(350 kW each), providing a total AC capacity of 46.55 MW, or equivalent, with minimum power of 350 kW. This solution enhances system reliability and facilitates monitoring.*

Grid connection options. *In principle, both underground cable and overhead line solutions were considered for connection to the transmission network. The final solution foresees a new 110/35 kV substation with two 31.5 MVA transformers and connection to the CGES 110 kV network. The detailed configuration (OHL versus UGC for specific segments) will be determined in consultation with the transmission system operator, balancing technical, environmental, and social considerations.*

In summary, the selected technology for Rudine SPP—bifacial modules, fixed-tilt mounting, distributed string inverters, and a dedicated 110/35 kV substation—was identified as the most technically reliable, economically viable, and environmentally appropriate solution for the site conditions.

3.5. Technological Options for the Transmission Line

The connection of the PV plant to the grid will be realised by **reconstructing the existing 110 kV overhead transmission line** *between the project site and the* **Vilusi substation**, *with a total length of approximately* **10 km**. *The reconstruction will take place along the existing alignment, thus minimising the need for new land take and reducing potential environmental impacts.*

Two technological options were considered:

1. **Overhead Line Reconstruction (Preferred Option)**
    - *Replacement of existing towers with new steel lattice structures where necessary;*
    - *Replacement of conductors and insulators to meet current technical standards;*
    - *Rehabilitation of foundations and access paths;*

- *Implementation of bird-protection devices to increase line visibility and reduce collision risk.*
- *This option is technically feasible, cost-effective, and uses existing corridors, minimising new environmental and social impacts.*

2. **Underground Cable (Not Preferred)**

- *While technically possible, this option would require significant earthworks, including trenching across rugged karst terrain, resulting in higher construction impacts and costs.*
- *Maintenance and fault detection would be more complex.*
- *For these reasons, this option was discarded in the preliminary design stage.*

The **overhead line reconstruction** *option was therefore selected as the* **technically and economically most viable** *alternative, aligned with existing infrastructure and consistent with transmission system operator (CGES) requirements.*

3.6. No-Project Alternative

The "no-project" scenario represents the situation in which the Rudine Solar Power Plant is not constructed. This alternative is required under both the EU EIA Directive and EBRD PR1, as it provides a baseline against which the benefits and impacts of the project can be evaluated.

Under the no-project alternative:

- *The site would remain in its current state, consisting of karst terrain with shallow soils and limited agricultural or grazing use. No construction works would occur, and no new infrastructure would be developed.*
- *There would be no potential negative impacts associated with land take, visual change, construction nuisance (dust, noise, traffic), or biodiversity disturbance.*
- *However, the positive impacts of the project would also not materialise. Montenegro would miss the opportunity to generate approximately 73 GWh of renewable electricity annually, equivalent to the consumption of over 15,000 households, and to avoid associated greenhouse gas (GHG) emissions.*
- *The country would remain more reliant on conventional generation sources, particularly lignite from the Pljevlja Thermal Power Plant, which is scheduled for gradual phase-out under the National Energy and Climate Plan (NECP) and the Low-Carbon Development Strategy (LCDS).*
- *The potential socio-economic benefits of the project—including local employment during construction, tax revenues for the municipality, and the contribution to national RES targets—would be foregone.*

4. Description of the Project

4.1. General Information

The SPP Rudine is being developed by Qair Montenegro d.o.o., a renewable energy company active in the Western Balkans. The project is located within KO Rudine, Municipality of Nikšić, approximately 20 km from the town of Nikšić, on a plateau of karst terrain. The total footprint of the project is estimated at 74.8 hectares.

The plant will have an installed capacity of 46.55 MW (AC), with a direct current (DC) peak capacity of 49.875 MWp, and will consist of approximately 79,800 photovoltaic (PV) modules. The estimated annual electricity production is 73 GWh, which will be delivered to the Montenegrin transmission grid.

The key objectives of the project are:

- ✓ *To generate renewable electricity in line with Montenegro's National Energy and Climate Plan (NECP) and Low-Carbon Development Strategy (LCDS).*
- ✓ *To contribute to Montenegro's climate commitments, including its Nationally Determined Contribution (NDC) of reducing greenhouse gas emissions by 35% by 2030 compared to 1990 levels.*
- ✓ *To strengthen energy security by diversifying the national generation mix and reducing reliance on lignite-fired power from the Pljevlja Thermal Power Plant.*
- ✓ *To bring local socio-economic benefits, including employment opportunities during construction and operation, as well as tax revenues for the Municipality of Nikšić.*

Photovoltaic (PV) systems for electricity generation through the conversion of solar energy represent one of the most promising areas of energy sector development. The most important characteristics of these systems, which distinguish them from other conventional electricity generation systems, are:

- *PV systems do not emit CO_2 or other harmful gases and do not pollute the environment.*
- *They do not generate noise.*
- *They can be constructed locally, including in urban areas.*
- *They provide partial energy independence from market conditions.*

Principle of Operation of a Photovoltaic Cell

Solar cells are semiconductor structures designed to convert solar radiation, i.e. thermal energy, into electrical energy. A solar cell is composed of a large number of electronic components and special semiconductor materials, such as silicon. A cross-section of a silicon solar cell, regardless of its type, is shown in the figure below.

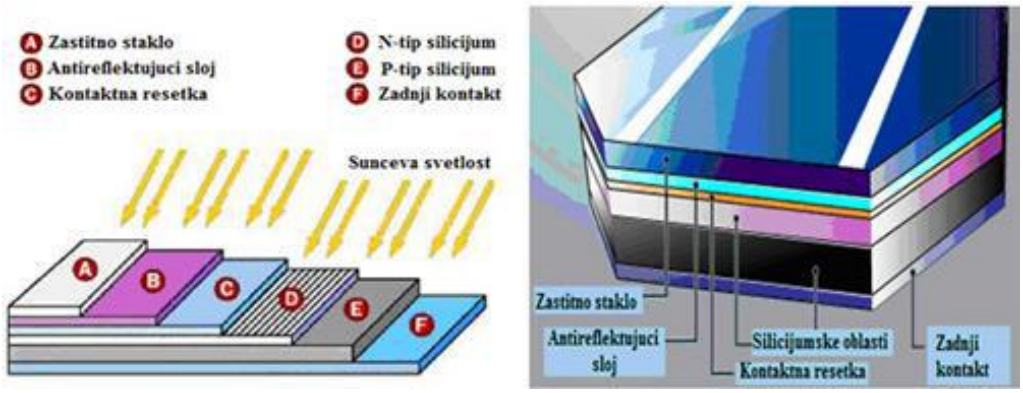

Figure 4-1: Structure of photovoltaic cells

The first layer consists of protective glass (SiO_2), which shields the cell from external influences. Beneath it lies an anti-reflective layer, which reduces light reflection and ensures that as much energy as possible reaches the semiconductor, thereby increasing the efficiency of the solar cell. Next is the system of transparent conductive electrodes (TCO), which establish contact with the semiconductor and the PN junction, where photons of sunlight are collected. On the underside is the metallisation layer, serving as the rear contact.

4.2. Main Technical Characteristics

The Rudine Solar Power Plant will consist of the following key technical components:

PV modules

A total of **79,800 Jinko Tiger Neo N-type bifacial modules** *with a rated power of* **625 Wp each**, *or equivalent, with minimum power of 600 Wp, providing a combined installed DC capacity of* **49.875 MWp**.

Mounting system
Modules will be installed on fixed-tilt steel structures anchored to precast reinforced concrete piles (estimated up to 40,000 units, 40 × 40 cm). This system ensures long-term stability while minimising land disturbance.

Inverters
The project will use 133 Sungrow SG350HX string inverters with a capacity of 350 kW each, or equivalent, with minimum power of 350 kW, providing flexibility, high efficiency, and reliable grid integration.

Surface coverage
The area covered by PV modules will be approximately **202,777 m²**, *which represents about 27% of the total site footprint.*

Substation and grid connection
Electricity generated by the plant will be collected through an internal MV underground cable network and transformed in a new on-site 110/35 kV substation equipped with 2 × 31.5 MVA transformers. The substation will be connected to the Montenegrin transmission network (CGES) at 110 kV level.

Expected output
Based on PVGIS modelling for the Nikšić plateau, the Rudine SPP is expected to produce approximately 73 GWh annually, equivalent to the consumption of more than 15,000 households in Montenegro.

The main technical parameters of the Rudine Solar Power Plant – Phase 1 are presented in the table below.

Table 4-1: Technical parameters of the project

Parameter	Value
Plant name	*Rudine Solar Power Plant – Phase 1*
Type of facility	*Solar power plant*
Primary energy source	*Solar energy*
Installed capacity	*46.55 MW*
Grid connection voltage level	*110 kV*
Nominal inverter voltage	*0.8 kV*
Operating mode	*Parallel operation with the Transmission System Operator (TSO) grid*
Number and type of PV panels	*79,800 panels, Tiger Neo N-type 66HL4M-BDV or equivalent*
Rated power of PV panels	*625 Wp*
Total PV panel capacity	*49.875 MWp*
Number and type of inverters	*133 units, SG350HX or equivalent*
Rated power of inverter	*350 kW*
Total inverter capacity	*46.55 MW*

The investor will ensure during procurement that any selected equipment will have equal or better technical characteristics. This will not affect the overall environmental or social impact of the PV.

4.2.1. Selection of Photovoltaic Panels

Based on the availability of photovoltaic panels on the European and local market, monocrystalline silicon PV panels similar to the type Tiger Neo N-type 66HL4M-BDV, with a power output of 625 Wp, manufactured by Jinko Solar, or equivalent, with minimum power of 600 Wp, are foreseen. The product warranty is 12 years, while the linear performance warranty of the panels is 30 years.

Figure 4-2: Photovoltaic panel layout

The selected bifacial panel has a capacity of 625 Wp, dimensions of 2238 mm × 1134 mm × 30 mm, and a weight of 32.4 kg. Interconnection between panels is achieved using an integrated cable with a cross-section of 1×4 mm², with lengths of (+) 0.4 m and (–) 0.2 m, supplied as part of the panel. The cables must be protected against UV radiation and direct sunlight exposure.

The selection of this type of PV panels at this stage defines only the technical characteristics, and therefore does not predetermine the final choice of product.

4.2.2. Inverter

An inverter is an electrical device that converts the direct current (DC) voltage generated by photovoltaic panels into standard alternating current (AC) voltage. In short, the inverter transforms direct current into alternating current. The inverter represents an autonomous device within a photovoltaic system.

There are three main classes of solar inverters, each used in different types of solar systems. Standalone solar inverters are used in isolated systems that directly power appliances or houses. Grid-tied inverters, also known as synchronous inverters, create a connection between the household system and the distribution grid. Multifunctional inverters combine the features of both types.

For the design of this project, SG350HX inverters manufactured by Sungrow, or equivalent, with minimum power of 350 kW , have been selected. These inverters have an installed capacity of 350 kW, and each contains 12 MPPT devices, each with 2 DC inputs, which monitor and manage the input voltage in real time to ensure maximum output power at all times.

Figure 4-3: Appearance of the SG350HX Inverter

The inverters must be equipped with appropriate communication and control interfaces. System operation is monitored by connecting the inverters to a LAN network using suitable communication cables. The inverter is equipped with anti-islanding protection, meaning it automatically disconnects in case of a grid power outage. In other words, it is not possible to feed electricity into the grid if grid voltage is absent.

The inverter performs automatic synchronisation with the distribution grid at 0.8 kV.
At this stage, the selection of inverter type defines only the technical characteristics and does not determine the final choice of product. Detailed technical specifications are provided in the annex to this documentation.

4.2.3. Configuration of the Solar Power Plant

The installed capacity of the plant, i.e. the sum of the power of all inverters, amounts to 46.55 MW. The plant will be connected to the transmission network through a 110/35 kV substation with a capacity of 2 × 31.5 MVA.

The plant will include 10 internal substations (35/0.8 kV, 2 × 2.5 MVA each). Nine of these substations will connect 14 inverters each (350 kW per inverter), while one substation will connect 7 inverters of 350 kW. Each inverter will be connected to 600 panels of 625 Wp, meaning that the DC power per inverter amounts to 375 kWp. In total, the plant will use 133 inverters and 79,800 panels, with a total DC capacity of 49.875 MWp.

The final choice of substation type will be made during the preparation of the Detailed Design. At that stage, the investor or designer may opt for different voltage levels and transformer capacities, while the total capacity and number of inverters must remain unchanged, i.e. the plant capacity will remain 46.55 MW.

Each inverter will be connected to 600 panels, arranged in 20 strings (30 panels per string, 2 strings per MPPT input). The panels will be mounted on the ground on steel structures designed to provide optimal annual energy generation. Inverters will be placed on steel structures in the shade of the panels, in positions defined in the design drawings.

Given the installed capacity of the plant, it is necessary to provide an appropriate transformer facility for its connection to the transmission network. During the preparation of the Conceptual Design, the designer considered the construction of a 110/35 kV substation (2 × 31.5 MVA) with an associated 110 kV overhead line for integration into the transmission grid. However, the final connection method will be defined in the Detailed Design after the connection conditions are issued by the Montenegrin Transmission System Operator (CGES). Based on these conditions, the single-line diagram and the

block scheme of the supply system will be prepared.

Within the 110 kV facility, it will be necessary to install a metering cell with the required measuring equipment and an indirect settlement meter. This meter will allow for bidirectional measurement of energy flows: on the one hand, the measurement of energy consumed by auxiliary systems of the plant, and on the other hand, the measurement of electricity delivered from the plant to the transmission network.

From the layout, it can be observed that the panels are arranged in multiple similar segments, each consisting of several rows. Each row is made up of two panels mounted one above the other, forming strings of 60 panels per row. This configuration enables easier construction and DC cabling. All panels within one segment are connected to a single inverter. Each row is spaced in such a way as to prevent shading of the row behind it. The segments are separated to allow vehicle access corridors.

The layout (See Figure 4-4) drawing also shows the positions of the substations. The **35/0.8 kV substations** *are positioned along the central corridor of the solar plant, while ensuring that they do not cast shadows on the panels. The* **110/35 kV connection substation** *is located at the lower end of the plot.*

Figure 4-4: Overall layout of the Rudine Solar Power Plant

The method of connecting the main substation to the transmission system will be defined in the Detailed Design, in accordance with the conditions issued by the transmission system operator, **CGES**.

As noted earlier, the total number of panels is **79,800**. *Based on the panel dimensions, the panels will cover an area of approximately 202,777 m².*

Depending on the chosen installation method and type of mounting structure in the Detailed Design, the preparation of foundations for supporting posts will vary. The most invasive option involves the construction of concrete foundations with dimensions of 40 × 40 cm. While the exact number of required posts cannot be determined at the Conceptual Design stage (it will be defined in the civil works of the Detailed Design), the maximum number is estimated at around 40,000 posts, corresponding to a total foundation surface area of approximately 6,400 m², with spacing to be calculated during detailed design.

The **traffic infrastructure** *is planned to retain existing road routes on the site, complemented by a*

newly planned central corridor which, considering slope and position, will serve as the main connection to the future substation. This eliminates the need for additional new access roads. In addition to providing unobstructed access for construction vehicles, this road will also ensure vehicle access during the operation of SPP Rudine, for the purposes of overhaul, maintenance, and other interventions.

4.2.4. Substations and Grid Connection

The Rudine Solar Power Plant will be connected to the Montenegrin transmission network through a newly constructed 110/35 kV substation located within the project site. The substation will be equipped with two transformers of 31.5 MVA each, ensuring reliable step-up transformation from the medium voltage level to the 110 kV transmission level.

The internal configuration of the solar power plant foresees the use of 10 medium-voltage substations (35/0.8 kV, 2 × 2.5 MVA each). Nine of these substations will connect 14 inverters each (350 kW per inverter), while one substation will connect 7 inverters, leading to a total of 133 inverters. Each inverter will be connected to 600 panels of 625 Wp, grouped into 20 strings (30 panels per string, 2 strings per MPPT input).

The overall installed DC capacity of the solar power plant is 49.875 MWp, with an AC output capacity of 46.55 MW.

The final choice of substation type and voltage levels will be confirmed during the Detailed Design phase, in accordance with the technical connection conditions issued by CGES. At that stage, the single-line diagram and block scheme of supply will also be finalised.

The 110 kV facility will include a metering cell equipped with appropriate measuring devices and a bidirectional settlement meter. This will allow both measurement of energy consumed by the plant's auxiliary systems and measurement of energy delivered to the transmission network.

4.2.5. Water Supply within the Solar Power Plant

The site is not equipped with utility connections to the sewage and water supply networks. Therefore, it is necessary to provide a water reservoir with a pumping station, the capacity of which will be defined in the Detailed Design. The reservoir will be supplied either by accessing groundwater (subject to hydrogeological investigations), collecting rainwater, or water delivery by tankers. The reservoir will be positioned at a higher elevation point, enabling the gravitational distribution of water to final consumption points as required.

These water reserves will be used not only for fire protection of the site but also for the maintenance and washing of PV panels, which is required periodically during operation.

Sanitary wastewater infrastructure will be located at the lower part of the site, at the entrance near the auxiliary building, in the form of a bio-septic tank designed for a small number of users.

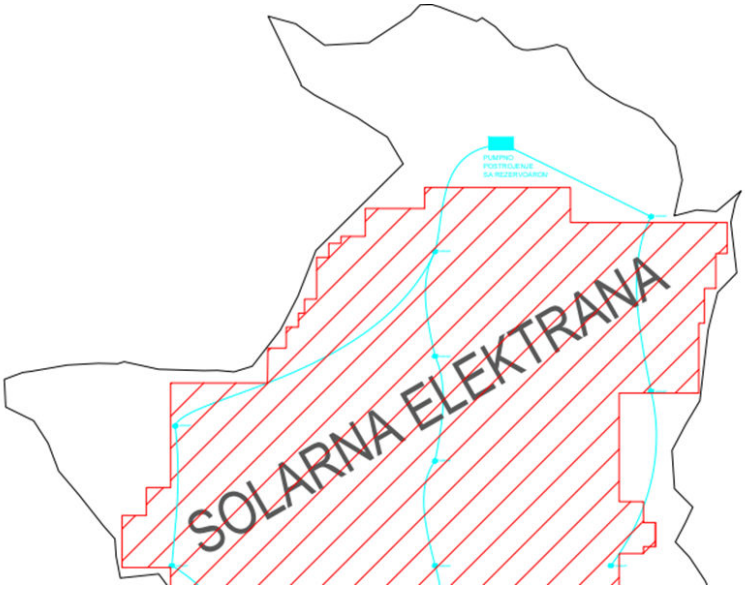

Figure 4-5: Pumping station with reservoir – blue line

4.2.6. Security of Location

The solar power plant site is planned to be fenced in accordance with the **guidelines from the baseline biodiversity study**. *The fence will be 2 m high, with the bottom section elevated 20 cm above ground to allow the unobstructed passage of small animals.*

Figure 4-6: Example of panel fencing

For this purpose, a panel fence is envisaged, positioned along the PV fields at a distance of 3–5 m from the panels, serving to protect the installation. The fence will have a reinforced concrete foundation, through which a Fe/Zn grounding strip will be laid, with visible grounding connections provided.

Entrance gates are also foreseen, both along the main corridor and at points where existing roads will be intersected by the fencing.

In order to secure the site, the implementation of a video surveillance system for the solar power plant is planned, which is essential for ensuring the safety of the facility. The concept aims to provide comprehensive monitoring that covers key areas where authorised and unauthorised entry into the solar

power plant premises may occur, including substations and associated infrastructure.

The proposed system will include high-resolution cameras strategically positioned to ensure coverage of critical zones. The cameras will be equipped with night-vision capability and weather-resistant housing to ensure continuous operation under various environmental conditions. Motion detection and advanced analytical functions will be integrated to trigger alarms in the event of unauthorised access.

Video recordings will be transmitted to the central control room, enabling real-time monitoring and remote access via mobile devices.

Lighting of the site is planned in a way that minimises potential negative impacts on nocturnally migrating bird species, with the installation of light sensors to avoid continuous illumination during certain periods.

4.2.7. Cable Laying in Trenches

For free laying of cables in a trench, a 10 cm layer of fine sand (0–4 mm) is placed at the bottom, after which the cable is laid using rollers at 4–6 m spacing to avoid dragging or twisting. The drum is mounted on fixed stands, and the cable is unwound from the top side, with slack left in a snake-like pattern to compensate for temperature and soil settlement (approx. 3% extra length).

Cables must not be damaged during handling (no sharp edges, pulling force ≤ 5 × D^2; bending radius ≥ 15 × D). Laying is not allowed below +5 °C without special measures (e.g. pre-heating).

After laying and surveying the exact position for the cable cadastre, the cable is covered with an additional 14 cm sand layer. Multiple cables in the same trench are placed with 7 cm spacing, with PVC protective covers 10 cm above. Backfilling is done in 20 cm compacted layers (≥92% density), with red warning tape installed at 40 cm above the cable.

4.2.8. Mounting Structure

The structure of the facility will be designed in accordance with the architectural design, urban-technical conditions, and the functional requirements of the solar power plant. The primary task of the structure is to bear the vertical loads of the solar panels, as well as snow and wind loads, and to withstand seismic loads in the transverse direction.

Typically, for solar power plant projects, the panels are supported on rafters made of steel C-profiles (C 120×60×25×4 or C 120×60×25×3). The main supporting structure, which carries the rafters, consists of steel frames placed at an axial distance of 2.5 m (2.8 m at the perimeter), constructed from the following elements:

- ✓ *Beam (Rigla): HOP 140×80×4 (or 140×80×3)*
- ✓ *Column (Stub): HOP 70×70×3*
- ✓ *Bracing (Kosnici): HOP 60×60×3*

The steel structure is anchored into individual concrete foundations with dimensions 70 × 70 × 80 cm.

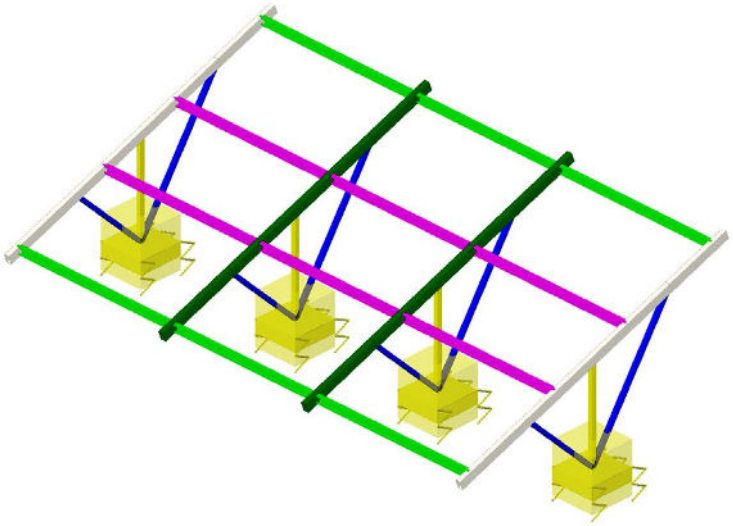

Figure 4-7: Steel structure for solar panels with foundations

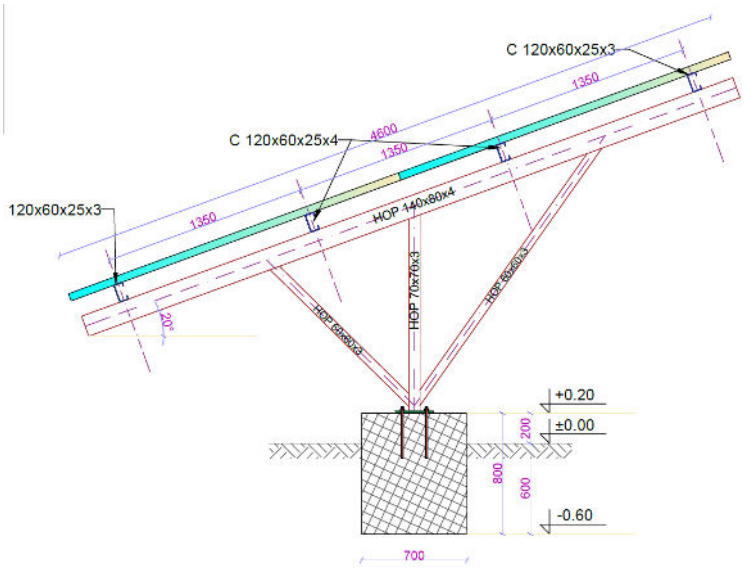

Figure 4-8: Dimensions of the steel structure for solar panels and foundations

4.2.9. Operation and Maintenance

Once commissioned, the Rudine Solar Power Plant will operate in parallel with the Montenegrin transmission grid, delivering an expected annual output of approximately 73 GWh of renewable electricity. The plant will be monitored and controlled via a SCADA system installed in the control room, enabling real-time supervision of generation, voltage, and performance of individual inverters and substations.

Operation activities will include:

- ✓ *Panel cleaning, carried out periodically to maintain efficiency, using water from the on-site reservoir.*
- ✓ *Vegetation management, primarily mowing or controlled grazing, to ensure panels remain*

unshaded.

- ✓ *Routine inspection and maintenance of modules, inverters, transformers, cables, and the 110/35 kV substation.*
- ✓ *Health, safety and environmental monitoring, in line with the Environmental and Social Management Plan (ESMP).*
- ✓ *Security and surveillance, including video monitoring and lighting adapted to minimise impacts on nocturnally migrating bird species.*

The operational lifetime of the solar power plant is estimated at 25–30 years, in line with the warranties of PV modules and inverters.

4.2.10. 110 kV Overhead Transmission Line (OHL)

The grid connection of the Rudine Solar PV Plant will be achieved through the reconstruction of an existing 110 kV transmission line, owned by the Montenegrin Transmission System Operator (CGES), and the construction of two short new sections of overhead line.

The planned reconstruction covers a section of approximately 10 km of the existing 110 kV Nikšić–Bileća transmission line, extending from the Rudine area to the Vilusi substation. These works are in line with the CGES Transmission Network Development Plan for the period 2025–2032, which foresees this reconstruction as part of the national grid reinforcement strategy. Reconstruction will involve replacement of existing towers where necessary, installation of new conductors and insulators, and foundation rehabilitation, as well as improvements to grounding systems.

In addition, the project investor Qair will construct:

- *A new 110 kV OHL of approximately 500 m, connecting the Rudine Solar PV Plant to the existing Nikšić–Bileća line; and*
- *A new 110 kV OHL of approximately 500 m, connecting the same line to the Vilusi substation.*

The transmission corridor follows the route of the existing line, crossing a karst plateau with sparse vegetation and low population density, which significantly reduces potential environmental and social impacts. The reconstruction and new OHL sections will run through predominantly karst and pasture land, without intersecting protected areas or zones of international ecological importance.

The environmental impacts are expected to be limited, as the works are largely confined to the existing transmission corridor. In addition, standard mitigation measures will be applied, including bird-protection devices, dust suppression, and good construction practices to avoid pollution and soil disturbance.

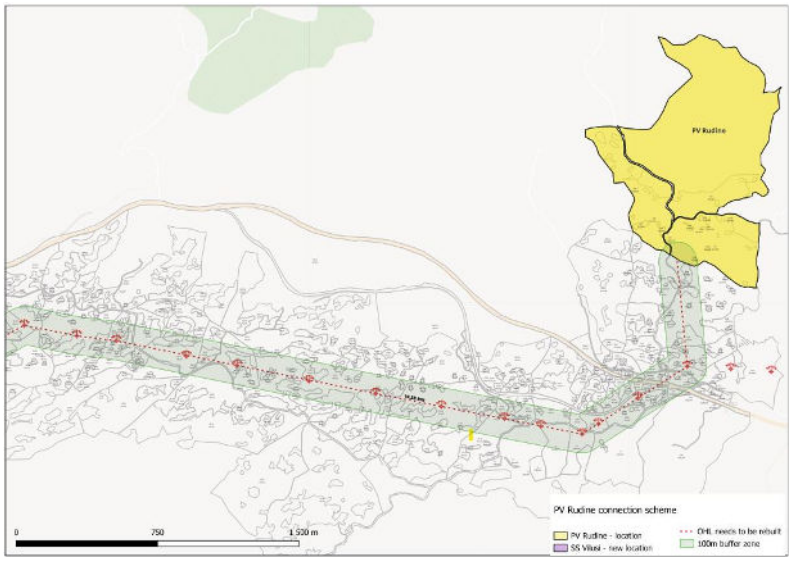

Figure 4-9: PV Rudine connection scheme – part 1

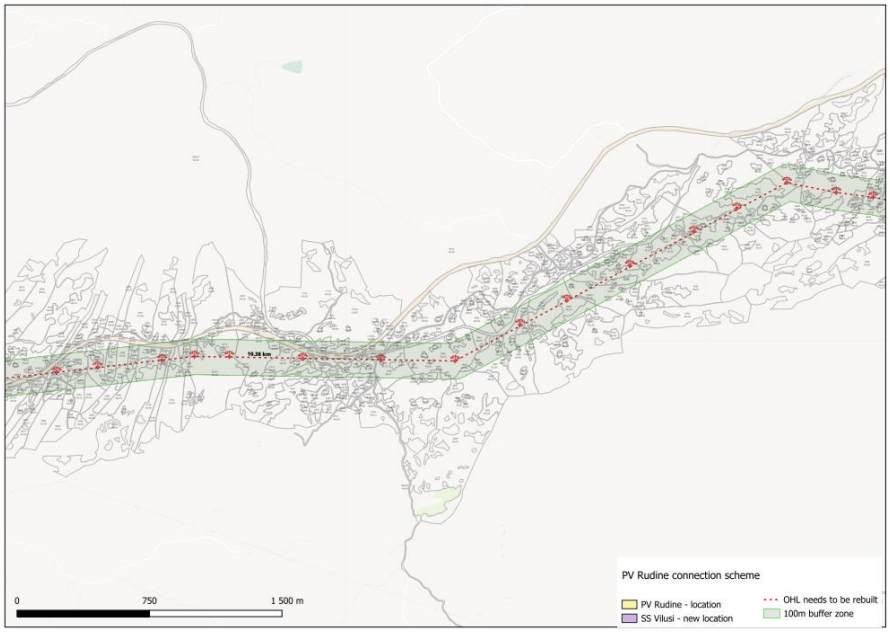

Figure 4-10: PV Rudine connection scheme – part 2

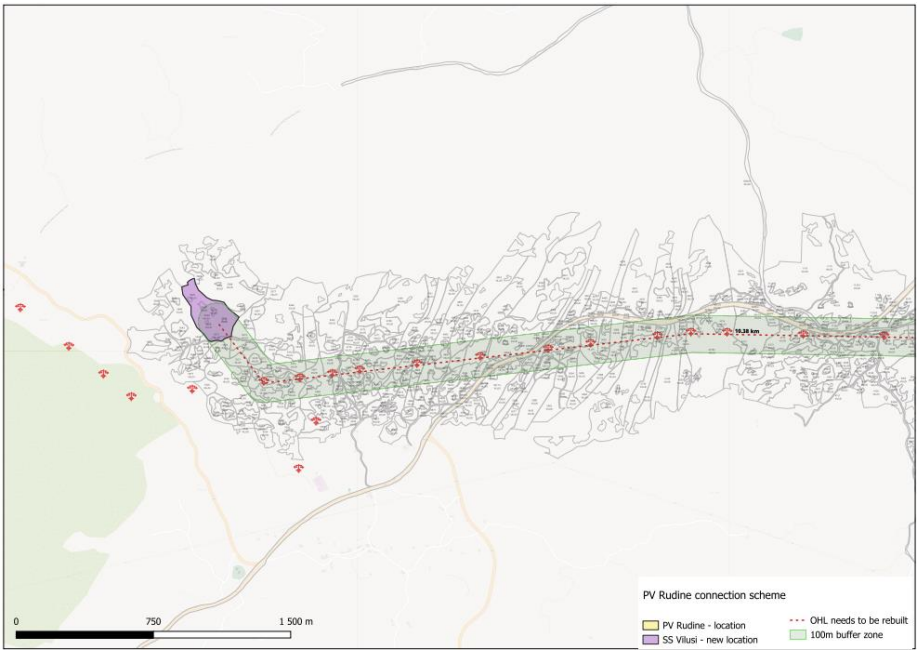

Figure 4-11: PV Rudine connection scheme – part 3

No underground cable is planned for this connection, as the terrain and technical conditions make overhead lines the most feasible and cost-effective option.

4.2.11. Decommissioning

At the end of its operational life, the Rudine Solar Power Plant will be decommissioned in accordance with Montenegrin legislation, EU environmental standards, and EBRD requirements.

Decommissioning activities will include:

- ✓ *Dismantling and removal of PV modules, inverters, transformers, mounting structures, and*

ancillary facilities.

- ✓ *Recycling and recovery of PV modules, electronic equipment, and metals, in line with the EU Waste Electrical and Electronic Equipment (WEEE) Directive.*
- ✓ *Removal of foundations (up to 40,000 concrete piles), to the extent technically and environmentally feasible, with restoration of the terrain.*
- ✓ *Waste management, ensuring safe handling, transport, and disposal or recycling of all decommissioned materials.*
- ✓ *Site rehabilitation, including soil stabilisation and possible return of land to agricultural or other uses, depending on owner's decision and local spatial planning requirements.*

A detailed Decommissioning Plan will be prepared closer to the end of the project's life cycle, in consultation with the relevant authorities, landowners, and stakeholders.

5. Environmental, Socio-economic and Cultural Heritage Baseline

5.1. Introduction

The purpose of the baseline assessment is to establish the current environmental, socio-economic and cultural conditions in the area of influence of the Rudine Solar Power Plant. This baseline provides the reference point against which potential project impacts will be assessed in later chapters of the ESIA.

The baseline has been prepared using a combination of desk-based research, including existing studies (EIA for Rudine, biodiversity baseline surveys, official statistics, and planning documents), field observations, and consultations with relevant institutions. The scope reflects the requirements of the EU EIA Directive and the EBRD Environmental and Social Policy (2024), with emphasis on those components of the environment and society most likely to be affected by the project.

The area of influence (AoI) includes the project site itself (74.8 ha), the immediate surroundings up to 1 km from the boundary, and relevant infrastructure corridors (central access road and 110/35 kV substation connection). Wider areas are also considered in relation to landscape, biodiversity (e.g. bird migration), and socio-economic linkages with nearby communities.

5.2. Climate

Nikšić represents a typical example of a transitional climate in Montenegro. This is a result of its central geographical position and its openness to maritime climatic influences, combined with the complex relief and the impact of surrounding high mountains. The fragmented relief creates diverse microclimates, with variations between closed depressions, open plateaus, and mountain slopes with different orientations. Relief also strongly influences the amount of precipitation: on mountains closer to the sea (Bijela Gora, Pusti Lisac, Lupoglav), precipitation increases with altitude up to 1,100 m and then decreases, while in the interior mountains the highest precipitation occurs at 1,500–2,000 m.

Certain parts of Nikšić municipality are more exposed to maritime influences than others. For instance, the Pješivci area and the Nikšić Field are open to maritime air through the Donja Zeta valley and Zeta plain towards Lake Skadar, and through the Bojana River valley towards the Adriatic Sea. The climate of Grahovo Field is shaped by its openness towards Boka Kotorska via Dragaljsko Polje and Ledenice, while the Banjani and Oputne Rudine areas are partly exposed through the Trebišnjica valley towards southern Dalmatia. Artificial reservoirs such as Slano, Krupac and Vrtac lakes influence the climate of the Nikšić Field, while Lake Bileća affects the lower areas of Banjani and Oputne Rudine. Industrialisation and urban expansion of Nikšić after World War II also contributed to local climatic changes.

The most important climatic elements are sunshine, air temperature, pressure, relative humidity, cloudiness, precipitation, and winds.

Sunshine: Nikšić records an average of 2,250 hours of sunshine annually, with the highest monthly average in July (322 h) and the lowest in December (97 h).

Temperature - The mean annual temperature is 10.9°C. January is the coldest month (1.5°C) and July the warmest (20.7°C), with an annual amplitude of 19.2°C. Negative temperatures occur from October to May, with values below –5°C recorded from November to March. On average, there are 65 days per year with minimum temperatures below 0°C, and about 20 days per year with maximum temperatures above 30°C. Heating is typically required for about 200 days per year (October–May). Frost is frequent, with an average of 66 frost days annually.

Humidity and cloudiness - Average annual relative humidity ranges from 68.6% in Nikšić to 79.8% in Grahovo, with the lowest values in July. Nikšić records about 29 foggy days annually, mostly around accumulation lakes and river valleys. The town has on average 94 clear days (26%), 107 cloudy days (29%), and the remainder moderately cloudy.

Precipitation - Precipitation varies significantly across the municipality. The highest values are recorded at Crkvice, near the municipal border, with an average of 4,742 mm/year (maximum 8,063 mm). Grahovo averages 3,140 mm, Nikšić 1,993 mm, and Velimlje 1,599 mm. At the Rudine site, average annual precipitation is about 1,783 mm. November is the wettest month across all locations. Snow accounts for about 12% of total precipitation, with an average of 19 snow days per year and 30 days with snow cover. Snowfall generally occurs between October and May, peaking in January.

Wind - Nikšić is characterised by strong north–south winds, with northerly winds prevailing (23.5%) followed by southerly (19.4%). The bora (north wind) is the dominant strong wind, bringing lower temperatures, clearer skies, and reduced humidity. Southerly winds bring warmth, cloudiness, and rain. Due to relief effects, the southern foehn occasionally appears, causing rapid warming, snowmelt, and local flooding. The maestral, a humid and rainy wind, is present in the western parts of the municipality closer to the coast.

5.3. Geography and soil

The area of the Municipality of Nikšić covers 2,065 km², making it the largest municipality in Montenegro, accounting for 14.95% of the country's territory. By population size, it is the second largest municipality, with 11.6% of Montenegro's inhabitants.

The administrative division of this territory has changed many times throughout history. For a long period, Pješivci, Grahovo, Banjani, **Rudine,** *Golija, Lukovo, Nikšićka Župa, and other parts of the current municipality functioned as separate municipalities. The centuries-old tribal division has left a strong mark that remains visible today, with certain spatial units still recognised by their traditional tribal names.*

The favourable geographical position and natural conditions have made Nikšić a crossroads of routes and a hub for connecting the mountainous, central, and coastal parts of Montenegro, as well as neighbouring countries and territories.

In addition to the area of the present municipality, the gravitational zone of Nikšić extends northeast towards the Tara River valley, Upper Morača, a large part of the Bjelopavlići plain, and the Katunski karst, covering an area of about 5,000 km².

Soils in the project area are shallow, skeletal, and poorly developed, with low fertility and limited agricultural productivity. The land is currently used mainly for extensive grazing and low-intensity agriculture, with little or no arable farming potential. The limited soil depth and stony structure also restrict vegetation growth, which contributes to the generally open character of the landscape.

5.4. Geology and geomorphology

The territory of the Municipality of Nikšić is predominantly composed of marine sediments, uplifted from the sea by tectonic forces and shaped by external geomorphological processes. Rock formations of geological ages ranging from the Upper Paleozoic to alluvium are present.

Permian deposits are composed of black carbonaceous and clay shales with thin coal interbeds, overlain by clay shales, marly grey layers, and thin-bedded limestones up to 40 m thick. In the Mesozoic, Triassic sediments are developed in the Nikšićka Župa area and west of the Nikšić Field around Grahovo and Vilusi. Middle Jurassic sediments are found in small areas at Crvena Kita, underlying large deposits of red bauxite. Lower Jurassic dolomites are identified around Praga, at the foothills of Mount Vojnik, west of Jasenovo Polje, near Šišman, at the foothills of Budoš, along the margins of the Nikšić Field, in Broćanac, Ljeskovi Dolovi, Brestice, around Vilusi, and in several other locations in the Grahovo Field area.

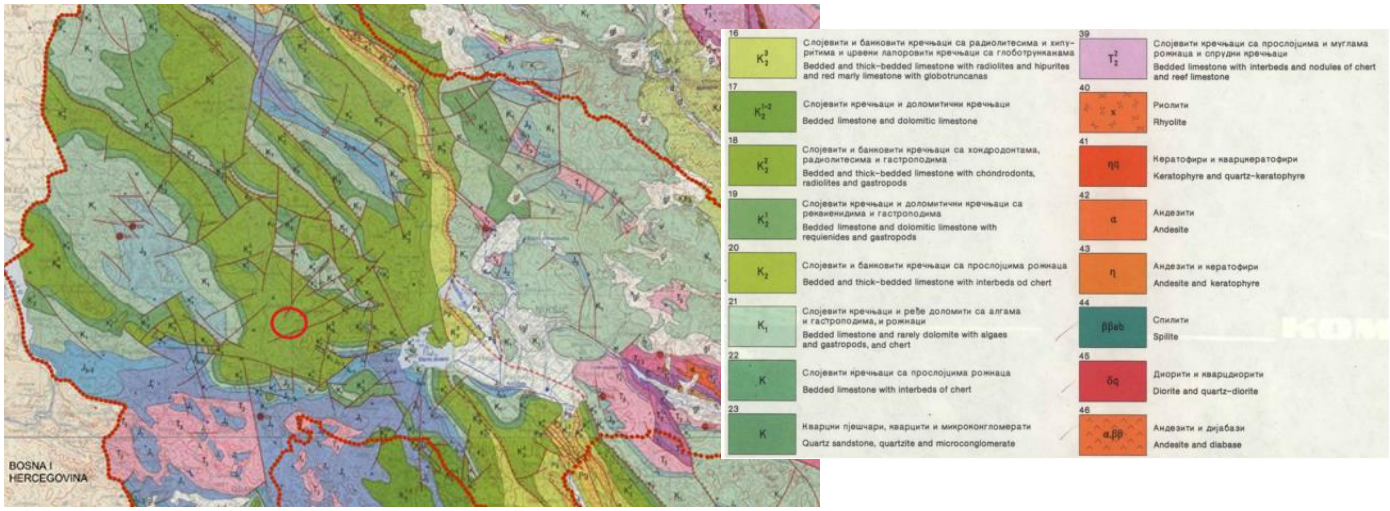

Figure 5-1: Position of SPP Rudine on Geological map of the Municipality of Nikšić (Source: Amendments to the Spatial-Urban Plan of the Municipality of Nikšić, Official Gazette of Montenegro 72/24

Lower Cretaceous sediments (limestones and dolomites) are widespread across the municipality, including parts of Prekornica (towards Dužice), the Štitovo plateau, areas of Vojnik, Studena, Tovići, Paklina, the northeastern slopes of Njegoš, the Srijeda mountain slopes, Zlostup, and Golija. These formations also extend west of Trepča, across parts of Rudine, around Velimlje, from Milovići to Petrovići, and areas of Budoš and Ljeskovi Dolovi.

Upper Cretaceous sediments consist mainly of pure limestones with occasional dolomites. They are present in parts of Prekornica, Međeđa, Ostroške Grede, Planinica, Cerovo, Srednja Gora, the villages of Bogmilovići, Vitasojevići, Milojevići, as well as in Budoš, Riđanske Rupe, Zla Gora, **Rudine***, Grahovo, Banjani, and Oputne* **Rudine.**

In the territory of the Municipality of Nikšić there are a large number of caves and pits, only a small portion of which have been explored. In areas such as Grahovo, **Bijele Rudine***, Banjani, Oputne Rudine, Golija, Duga, and Pješivci, where massive limestone formations (3,000–4,000 m thick) dominate, characteristic vertical karst landforms such as pits and shafts are common. The better-known caves are found around karst fields and along valley slopes, mostly representing former underground watercourses.*

In the Grahovo area, notable caves include Đakovića Cave in the hamlet of Bare on the northeastern edge of Grahovo Field, and nearby Vranjska Cave. Additional caves are located in the village of Zagora (two caves), in Jabuka (one cave), and the Vodena Cave in Kličevac. Caves are also present in Gornje Polje (hamlet of Zagulj) and in the area of Nudol. Around Vilusi, in the Pitoma Brda area and at Šćepan Gradina, two caves have been identified.

Numerous sinkholes (dolines) with steep sides are especially widespread in the western part of the municipality, particularly on the karst plateau of Rudine and Zla Gora. Their bottoms often descend into swallow holes or pits, and larger ones are typically filled with terra rossa.

On the karst **plateau of Rudine**, *valleys (uvalas) are also common. The largest is Velimlje Uvala, with relatively gently sloping sides and without strongly developed surface karst features. A series of smaller elongated uvalas gravitate towards this depression, formed in the system of ancient river valleys that have since dried up, with flows redirected underground due to karst erosion (M. Radulović).*

5.5. Hydrology

The Nikšić Field is a closed karst plain with specific and complex hydrological and hydrogeological conditions, resulting from the geological, geomorphological, and climatic characteristics of the area. It is a karst depression bordered by high mountains, covering an area of about 65 km², making it the largest karst field in Montenegro.

Due to the natural conditions that characterise it, this closed karst plain functions as a drainage system, receiving significant volumes of water from a catchment area of about 1,000 km², with annual precipitation of around 2,000 l/m². However, the specific hydrogeological regime has also resulted in pronounced infiltration of surface waters through porous karst rocks towards deeper horizons. [12]

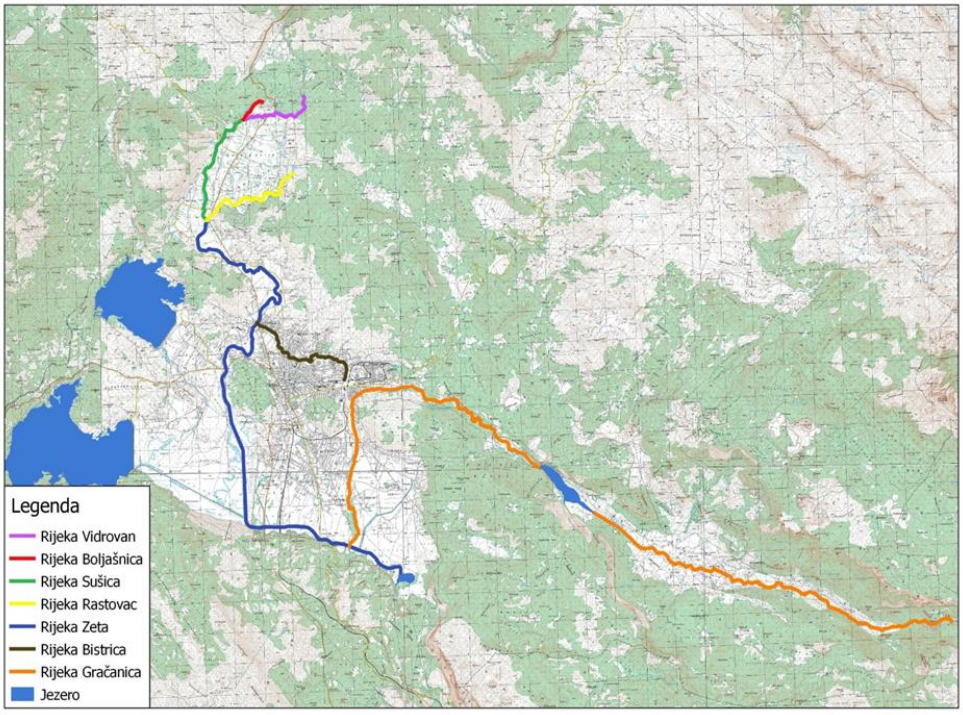

Figure 5-2: Main watercourses and lakes in the Nikšić Field

Increasingly evident climate change – manifested in the past decade through rising air temperatures, prolonged dry periods, irregular precipitation patterns, more intense rainfall, occasional record multi-day storms during the dry season, and a reduction in annual snowfall – has led to disturbances in groundwater flows, more frequent formation of torrential streams, floods, landslides, and rockfalls.

The reduction in annual snowfall, as projected by IPCC scientists, may negatively affect water supply.

[12] *Mitrović L.(2023).„Bolje razumijevanje voda usled klimatskih promjena, NVO „Društvo mladih ekologa“ Nikšić*

Larger amounts of snow in the catchment areas of springs delay the occurrence of the hydrological minimum (to September), compared to springs in catchments with less snowfall, where the hydrological minimum may occur as early as the beginning of August – i.e. during the period of peak water demand.

The Rudine SPP *site is located within the catchment area of the Nikšić Field, at its southwestern edge. Since the geological structure of the terrain consists of permeable karstified Upper Cretaceous limestones, there is no surface runoff or permanent watercourses. The nearest surface water body is the Slano reservoir, located about 10 km from the project site.*

As for the Rudine area itself, apart from the Vrelo spring under Mount Njegoš, no natural springs exist. *Traditionally, residents dug wide and deep wells in places with clay layers (ubli), where rainwater would collect and be used for human and livestock needs. After World War II, local authorities organised the population to build such primitive water intakes in different parts of Rudine. Some households also constructed covered cisterns, known as bistjerne.*

Thus, Oputne Rudine, Banjani, and Nikšićke Rudine are essentially water-scarce areas. During periods of heavy rainfall, flooding occurs in Velimsko Polje, Trepča, and less frequently in Nikšićke Rudine. The population relies on cisterns, clay wells (ubli), ponds, and snowmelt for water supply.

This part of western Montenegro represents a typical karst region, developed on highly tectonised carbonate rocks. All landforms and processes characteristic of bare karst (holokarst) are present. The hydrographic network is poorly developed, while small specific hydrogeological features (rock basins and ponds) occur. These serve as "hotspots" of biodiversity in the study area, as they represent the only water sources in an otherwise water-scarce karst environment.

Within the boundaries of the planned Rudine Solar Power Plant, on plot no. **797, KO Rudine**, *there is one such artificial pond, constructed a few years ago for the purpose of watering goat herds and meadows.*

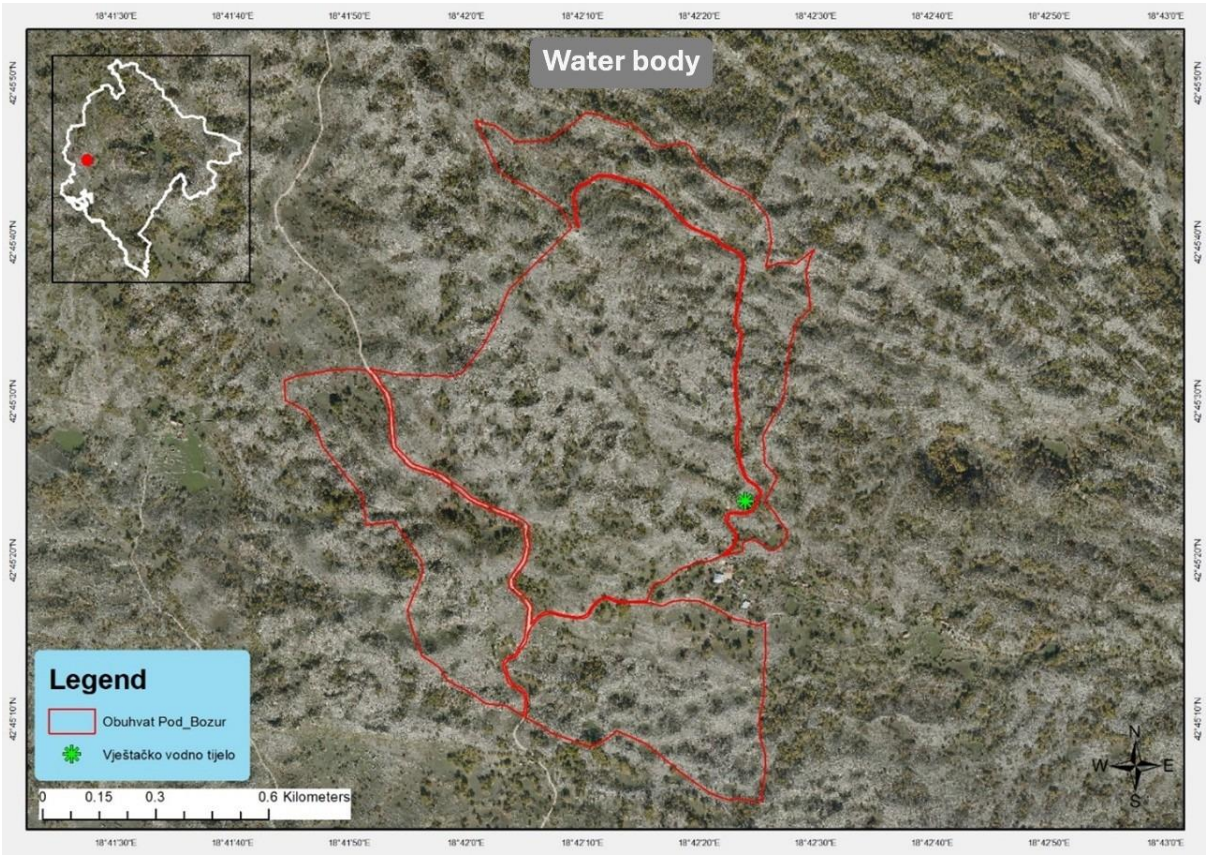

Figure 5-3: Water feature of anthropogenic origin within the project area (artificial pond at plot no. 797, KO Rudine, green star

5.6. Seismicity

The territory of the Municipality of Nikšić is located along the northern edge of the most seismically active zone of the Dubrovnik and Montenegrin coast. It can be established that the municipality lies in a zone where earthquakes of intensity VII–VIII° MCS may be expected. In the Donja Zeta valley earthquakes may reach up to VIII° MCS, while in the Nikšić Field and the areas of Duga and Golija up to VII° MCS. The southwestern part of the municipality (around Grahovo) falls within the VIII° MCS zone. Most of the municipal territory belongs to the VII° MCS zone, while only the northeastern boundary lies in the VI° MCS zone.

Within the municipality, relatively weaker earthquakes have been recorded, with maximum magnitudes up to 4.9 on the Richter scale. Earthquakes occur most frequently between Nikšić and Grahovo, towards Gatačko Polje, and along the northeastern boundary of the municipality. The Grahovo area belongs to a belt of increased seismic activity. The strongest earthquakes in this belt occurred in the Bay of Kotor, immediately adjacent to the southern municipal boundary, with intensities recorded at about IX° MCS (magnitude ~6.5). In Gatačko Polje, the strongest earthquake reached magnitude 5.6.

The usual focal depths (hypocentres) of recorded earthquakes range between 4 and 47 km. The highest maximum intensities originate from the major Montenegro earthquake of 1979.

Figure 5-4 shows the spatial distribution of main seismic events with magnitudes greater than 4 on the Richter scale in the wider area around the town of Nikšić.

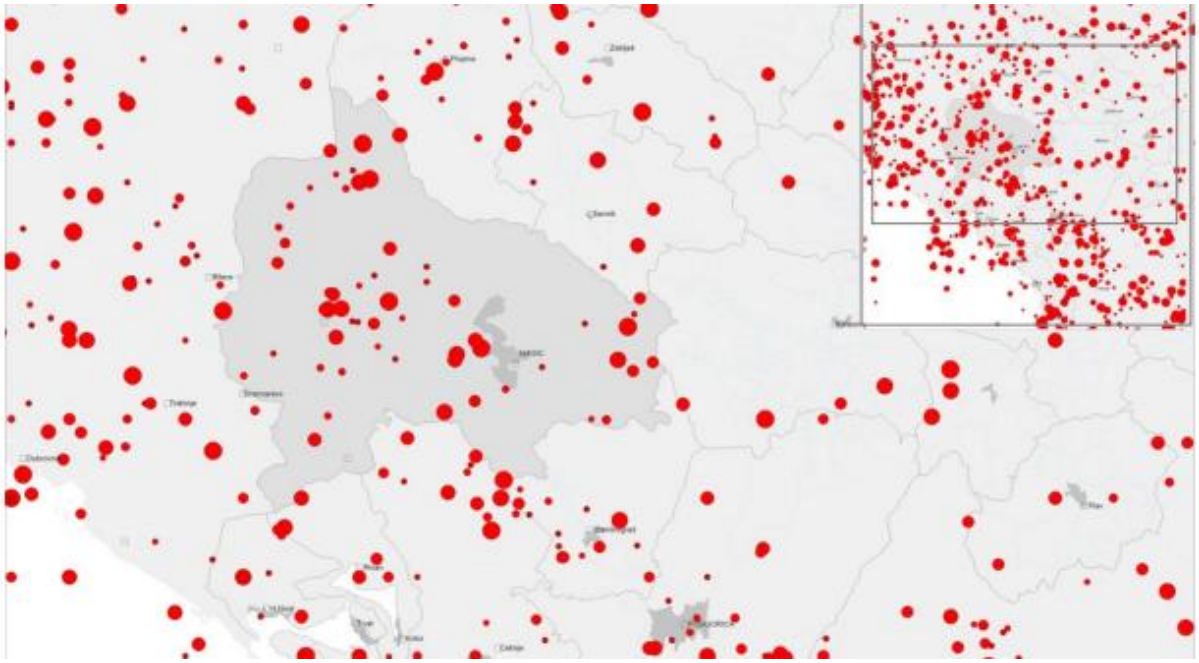

Figure 5-4: Spatial distribution of major seismic events with magnitudes greater than 4 on the Richter scale in the wider area around the town of Nikšić (Source: Amendments to the Spatial-Urban Plan of the Municipality of Nikšić, Official Gazette of Montenegro 72/24

5.7. Frola and Habitats

The territory of the Municipality of Nikšić covers a relatively large area (almost one quarter of the total territory of Montenegro). This region is characterised by diverse climatic influences, geological substrates, soil types, relief forms, and anthropogenic pressures. Such conditions have resulted in the formation of varied habitats, which in turn support diverse flora, fauna, and ecological communities (biocenoses), all of which interact continuously with their habitats, influencing and transforming one

another.

Ecologically significant areas – The importance of endemic, as well as generally rare and/or threatened species found in a particular area, has been emphasised through various international initiatives and programmes designed to identify centres or key areas for the biodiversity of certain groups, and thus for their conservation. These include IPA (Important Plant Areas), IBA (Important Bird Areas), IMA (Important Mammal Areas), IFA (Important Fish Areas), etc.

EMERALD sites are identified under the Convention on the Conservation of European Wildlife and Natural Habitats (the Bern Convention, 1979) and according to Resolution 4 (habitat types) and Resolution 6 (species). This Convention forms part of EU law and is applied across Europe and partly in Africa. Within the EU, EMERALD sites correspond to Special Areas of Conservation Interest (SACI).

In the territory of the Municipality of Nikšić, EMERALD sites of particular importance for nature protection include: Orjen, Golija, and Ledenice.

For the purpose of preparing the Biodiversity Baseline Study of the project area, and in line with contractual obligations, existing literature sources relevant to the site were collected. In addition, a multidisciplinary field survey was carried out by experts specialised in different groups of organisms, namely:

1. *Invertebrate fauna;*
2. *Amphibians and reptiles (batrachofauna and herpetofauna);*
3. *Avifauna (birds);*
4. *Mammal fauna; and*
5. *Flora and vegetation.*

The conservation status of species at both national and international levels was defined in accordance with national legislation as well as ratified international conventions/protocols, including:

- *Decision on the protection of rare, sparse, endemic and endangered plant and animal species (Official Gazette of Montenegro, No. 76/06);*
- *EU Habitats Directive;*
- *EU Birds Directive;*
- *Bern Convention on the Conservation of European Wildlife and Natural Habitats;*
- *Bonn Convention on the Conservation of Migratory Species of Wild Animals.*

5.7.1. Habitats

For the purposes of this Environmental Impact Assessment, a Biodiversity Baseline Survey was carried out by an expert team through several field campaigns. The objective of the floristic research was to determine the current state and main characteristics of flora in the project area. Fieldwork identified 126 plant species, providing a solid basis for further floristic and vegetation studies.

Although the project footprint is relatively small and there was no legal requirement for a baseline study, the investor proactively commissioned this survey. The site is not located within a protected area and has no national or international conservation designation.

Field surveys were conducted in April–May (covering peak vegetation and flowering periods, including orchids) and in June for insects. During this time, surveys also coincided with the peak activity of amphibians and reptiles, ensuring all species were recorded. The Biodiversity Baseline Report also incorporated previous studies, including data collected for Natura 2000, which added to the quality of the documentation. Some species of mammals and birds were recorded within a 500 m to several km radius of the project site, representing mobile (vagile) forms.

Table 5-1: Overview of plant species collected during field surveys (legend: +/- species protected under national law (Official Gazette of Montenegro, No. 76/06); species listed in: HD – Habitats Directive; IUCN Red List – Mediterranean)

Latine name of plants	MNE Law protected	IUCN	Habitat
***Acer campestre* L.**	-	LC	91M0
***Achillea millefolium* L**	-	LC	62A0
***Achillea millefolium* L.**	-	LC	62A0
***Ajuga reptans* L.**	-	-	62A0
***Anacamptis morio* (L.) R. M. Bateman, Pridgeon & M. W. Chase**	+	NT	62A0
***Asplenium ceterach* L.**	-	LC	62A0
***Agrimonia eupatoria* L.**	-	LC	6510
***Arrhenatherum elatius* (L.) J. Presl & C. Presl**	-	LC	6510
***Asplenium trichomanes* L.**	-	LC	62A0
***Asplenium ruta-muraria* L.**	-	LC	62A0
***Anchusella cretica* (Mill.) Bigazzi & al.**	-	-	62A0
***Anthoxanthum odoratum* L**	-	-	62A0
***Anthyllis vulneraria* L.**	-	-	62A0
***Arabis hirsuta (L.)* Scop.**	-	-	91M0
***Aristolochia rotunda* L.**	-	-	91MO
***Armeria canescens* (Host) Boiss.**	-	-	62A0
***Asparagus acutifolius* L.**	-	LC	91M0
Asperula taurine L.	-	-	91M0
***Asphodelus aestivus* Brot.**	-	LC	62A0
***Bellis perennis* L.**	-	-	62A0
***Bothriochloa ischaemum* (L.) Keng**	-	-	62A0
***Brachypodium pinnatum* (Huds.) P. Beauv.**	-	-	62A0
***Briza media* L.**	-	-	6510
***Bromus erectus* Huds.**	-	LC	62A0

***Bupleurum veronense* Turra**	-	-	62A0
***Carex humilis* Leyss.**	-	-	62A0
***Carlina acaulis* L.**	-	-	62A0
***Carpinus orientalis* Mill.**	-	LC	91M0
***Centaurea jacea* L.**	-	-	6510
***Chrysopogon gryllus* (L.) Trin.**	-	-	62A0
***Clinopodium vulgare* L.**	-	-	
***Cornus mas* L.**	-	LC	91M0
***Corylus avellana* L.**	-	LC	91M0
***Cotinus coggygria* Scop.**	-	LC	91M0
***Crataegus monogyna* Jacq.**	-	LC	91M0
***Cruciata glabra* (L.) Ehrend**	-	-	91M0
***Daucus carota* L.**	-	LC	6510
***Dianthus carthusianorum* L.**	-	-	6510
***Dactylis glomerata* L.**	-	-	6510
***Dorycnium pentaphyllum subsp. germanicum* (Gremli) Gams**	-	-	62A0
***Euphorbia cyparissias* L.**	-	-	91M0
***Euphorbia spinosa* L.**	-	-	62A0
***Eryngium amethystinum* L.**	-	-	62A0
***Edraianthus tenuifolius* (Waldst. & Kit.) A. DC.**			62A0
***Fragaria vesca* L.**	-	LC	91M0
***Frangula rupestris* (Scop.) Schur**	-	LC	91M0
***Fraxinus ornus* L.**	-	LC	91M0
***Fritillaria messanensis subsp. gracilis* (Ebel) Rix**	-	-	62A0
***Galium schultesi* Vest**	-	-	91M0
***Galium verum* L.**	-	LC	62A0
***Genista sericea* Wulfen**	-	LC	62A0
***Geranium purpureum* Vill.**	-	-	91M0
***Geranium sanguineum* L.**	-	-	62A0

***Glechoma hirsute* Waldst. & Kit**	-	DD	91M0
***Globularia cordifolia* L.**	-	-	62A0
***Hedera helix* L.**	-	LC	91M0
***Helleborus odorus* Willd.**	-	-	91M0
***Hepatica nobilis* Schreb.**	-	LC	91M0
***Hieracium pillosela* L.**	-	-	6510
***Hieracium racemosum* Willd.**	-	-	
***Hippocrepis comosa* L.**	-	-	62A0
***Hippocrepis emerus* (L.) Lassen**	-	-	91M0
***Iris reichenbachii* Heuff.**	-	-	62A0
***Koeleria splendens* C. Presl**	-	-	62A0
***Knautia arvensis* (L.) DC.**	-	-	6510
Lathyrus niger (L.) Bernh.	-	LC	91M0
Leontodon hispidus L.	-	-	62A0
***Lithospermum purpurocaeruleum* L.**	-	-	
***Lotus corniculatus* L.**	-	LC	62A0
***Luzula forsteri* (Sm.) DC.**	-	-	91M0
***Micromeria juliana* (L.) Benth. ex Rchb.**	-	-	62A0
***Micromeria parviflora* Rchb.**	-	-	62A0
Muscari racemosum Mill.	-	-	62A0
***Neotinea tridentata* (Scop.) R. M. Bateman, Pridgeon & M. W. Chase**	+	LC	62A0
***Ononis spinosa* L.**	-	LC	6510
***Ophrys scolopax subsp. cornuta* (Steven) E. G. Camus**	+	LC	62A0
Ophrys sphegodes Mill.	+	LC	62A0
***Orchis provincialis* Balb. ex Lam. & DC**	+	LC	62A0
***Orchis simia* Lam**	+	LC	62A0
***Origanum vulgare* L.**	-	LC	62A0
***Ostrya carpinifolia* Scop.**	-	LC	91M0

***Petrohargia saxifraga* (L.) Link**	-	-	62A0
***Plantago holosteum* Scop.**	-	-	62A0
Plantago lanceolata L.	-	LC	6510
***Plantago media* L.**	-	-	6510
***Polygala comosa* Schkuhr**	-	-	62A0
***Polygonatum odoratum* (Mill.) Druce LC**	-	-	6510
***Potentilla hirta* L.**	-	-	62A0
***Potentilla micrantha* DC**	-	-	91M0
***Primula vulgaris* Huds.**	-	-	91M0
***Prunus mahaleb* L.**	-	-	91M0
***Prunus spinosa* L.**	-	LC	62A0
***Pteridium aquilinum* (L.) Kuhn**	-	LC	6510
***Pulmonaria officinalis* L.**	-	LC	91M0
***Pyrus pyraster* (L.) Burgsd.**	-	LC	91M0
***Quercus cerris* L**	-	LC	91M0
***Quercus pubescens* Willd.**	-	LC	91M0
***Rosa canina* L.**	-	LC	91M0
***Rorippa pyrenaica* (All.) Rchb.**	-	LC	62A0
***Ruta graveolens* L.**	-	LC	62A0
***Rubus ulmifolius* Schott**	-	-	91M0
***Salvia officinalis* L.**	-	LC	62A0
***Sanguisorba minor* Scop.**	-	-	6510
***Satureja montana* L.**	-	-	62A0
Satureja subspicata* Bartl. ex Vis. subsp. *subspicata	-	-	62A0
***Scilla lakusicii* Šilic**	+	-	62A0
***Silene vulgaris* (Moench) Garcke**	-	LC	6510
***Sedum acre* L.**	-	LC	62A0
***Sedum album* L.**	-	-	62A0
***Sedum hispanicum* L.**	-	-	62A0

***Smyrnium perfoliatum* L.**	-	-	6510
***Symphytum tuberosum* L.**	-	-	62A0
***Taraxacum sect. Taraxacum* F. H. Wigg**	-	LC	6510
***Teucrium capitatum* L.**	-	-	62A0
***Teucrium chamaedrys* L**	-	LC	62A0
***Teucrium chamaedrys* L.**	-	LC	62A0
Teucrium montanum L.	-	-	62A0
***Thymus longicaulis* C. Presl**	-	-	62A0
***Tragopogon tommasinii* Sch. Bip.**	-	-	62A0
***Trifolium incarnatum* L.**	-	-	62A0
***Tragopogon pratensis* L.**	-	-	6510
***Trifolium pratense* L.**	-	LC	6510
***Tulipa sylvestris* L.**	-	-	62A0
***Urtica dioica* L.**	-	LC	62A0
***Valeriana tuberosa* L.**	-	-	62A0
***Veronica chamaedrys* L.**	-	-	91M0
***Veronica officinalis* L.**	-	LC	91M0
***Vicia grandiflora* Scop.**	-	LC	91M0
***Vincetoxicum hirundinaria* Medik.**	-	-	62A0

During the field surveys of the project area, three different NATURA 2000 habitats were identified (Figure 18):

- ✓ *91M0 Pannonian-Balkanic Turkey oak–sessile oak forests;*
- ✓ *62A0 Eastern sub-Mediterranean dry grasslands (Scorzoneretalia villosae); and*
- ✓ *6510 Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis).*

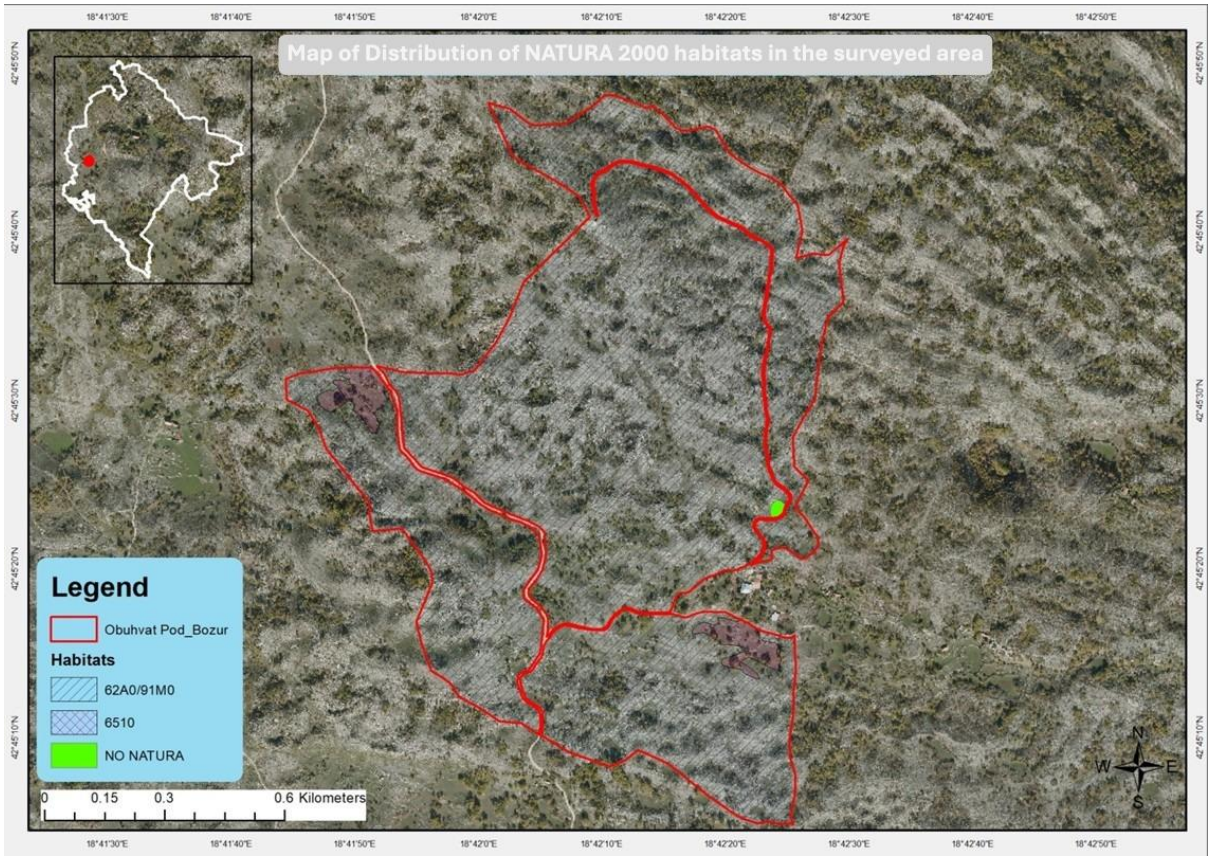

Table 5-2: Distribution of NATURA 2000 habitats in the surveyed area

5.7.2. Fauna

Invertebrate fauna

Field and literature surveys conducted in 2024 confirmed the presence of 192 invertebrate taxa at the Rudine site and its wider surroundings. The recorded groups include Gastropoda, Araneae, Odonata, Lepidoptera, Coleoptera, Hymenoptera, Orthoptera, and Mantodea. This high level of species richness reflects the mosaic of habitats present in the karst plateau, including grasslands, rocky outcrops, scrub vegetation, and small anthropogenic water bodies.

Among the recorded taxa, several species are of particular conservation concern:

Hirudo verbana (medicinal leech) *– listed in Annex V of the EU Habitats Directive, included in the Bern Convention, and categorised as Near Threatened (NT) on the IUCN Red List. This species is sensitive to habitat degradation and depends on clean, stable freshwater habitats such as ponds and slow-flowing streams.*

Zerynthia polyxena (southern festoon butterfly) *– listed in Annex IV of the EU Habitats Directive, protected under Montenegrin law, and assessed as Near Threatened (NT) by the IUCN. It is an indicator of high-quality grassland habitats and relies on Aristolochia species as larval host plants.*

Aeshna cyanea (southern hawker dragonfly) *– although widespread and categorised as Least Concern (LC) on the IUCN Red List, this species is considered an ecological indicator of freshwater habitat quality. Its presence in the Rudine area highlights the importance of small karst ponds and temporary water bodies as local biodiversity "hotspots".*

While most other recorded invertebrates are common species with wide distributions, the occurrence of these taxa of conservation interest elevates the ecological importance of the project area. The

artificial pond located within the project footprint represents a particularly valuable microhabitat, supporting aquatic and semi-aquatic invertebrates.

Potential project impacts on invertebrates are primarily associated with habitat loss, disturbance during construction, and changes in microclimatic conditions. Given the presence of protected and sensitive species, mitigation measures will be required, including the preservation of karst ponds where possible, careful timing of construction works, and ecological monitoring.

Amphibian and Reptile Fauna

Field surveys conducted in 2024 confirmed the presence of **14 reptile species** *and* **4 amphibian species** *in the Rudine project area. This relatively high diversity reflects the transitional biogeographical position of the Nikšić plateau, where a predominantly continental climate is strongly influenced by Mediterranean conditions.*

Most of the recorded taxa are widespread species typically associated with **karst grasslands, rocky outcrops, and scrub vegetation***, while amphibians depend on* **temporary ponds and water bodies** *that represent important breeding habitats in this otherwise water-scarce landscape.*

Several species of **particular conservation importance** *were documented:*

- **Greek smooth newt (*Lissotriton graecus*)** *– a* **Balkan endemic amphibian***, restricted to the peninsula and dependent on small aquatic habitats such as ponds and temporary water bodies.*
- **Hermann's tortoise (*Testudo hermanni*)** *– of high conservation concern, listed under the EU Habitats Directive (Annex II & IV) and CITES Appendix II, and categorised as Near Threatened (NT) on the IUCN Red List. This species is sensitive to habitat loss, fragmentation, wildfires, and illegal collection.*
- **Karst lizard (*Podarcis melisellensis*)** *– a Balkan endemic reptile, nationally protected, classified as Least Concern (LC) at the global level, but important due to its restricted distribution.*
- **Blue-throated keeled lizard (*Algyroides nigropunctatus*)** *– a Balkan subendemic species, protected under national legislation and assessed as Least Concern (LC) by IUCN.*
- **Common toad (Bufo bufo)** *– a widespread amphibian but listed as a protected species under national legislation; ecologically important as a regulator of invertebrate populations.*
- **Marsh frog (Pelophylax ridibundus)** *– also a protected species, strongly associated with aquatic habitats such as ponds and wetlands, making it sensitive to changes in local hydrology.*

The presence of these taxa highlights the ecological importance of the Rudine plateau, particularly in terms of endemic and regionally significant species. While the majority of recorded reptiles and amphibians are common and not globally threatened, their role in the local trophic web and as indicators of habitat quality is significant.

Birds

Field surveys and literature data confirmed the presence of a diverse avian community in the Rudine area, reflecting the location's open karst plateau habitats, grasslands, scrub vegetation, and proximity to agricultural land and wetlands.

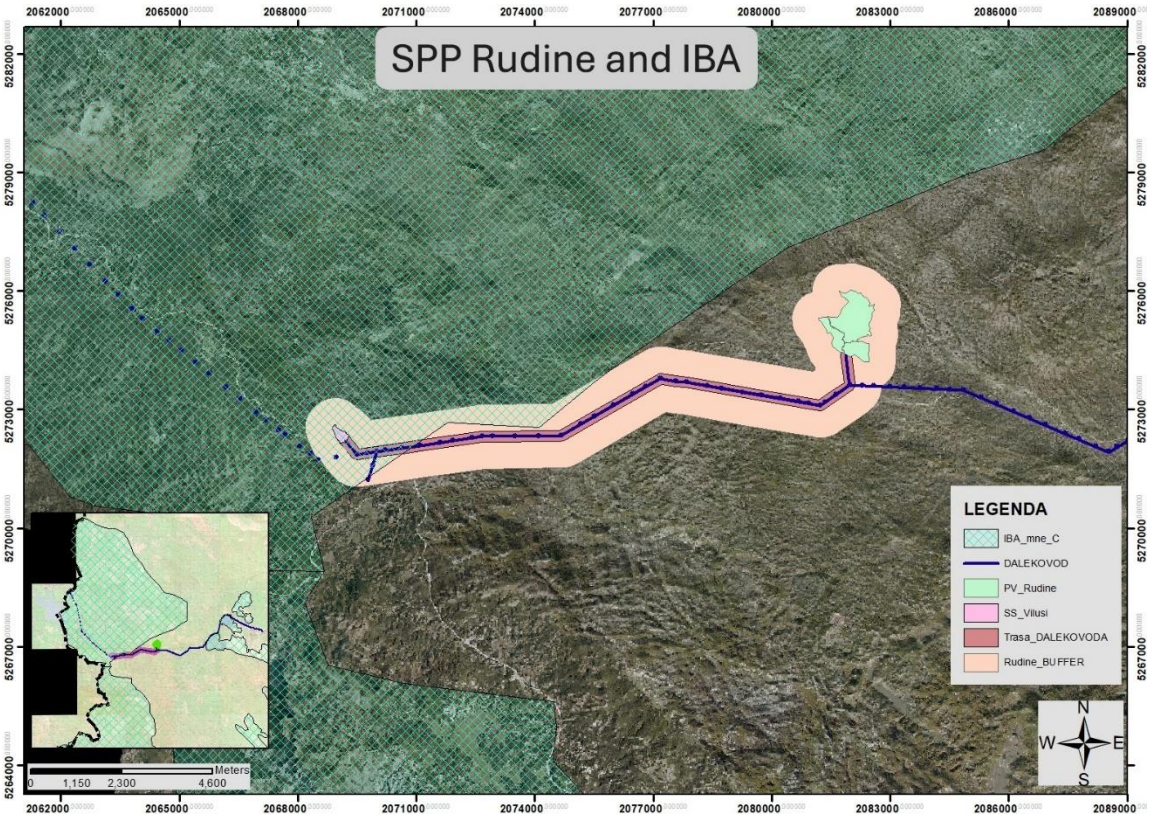

Figure 5-5: SPP Rudine, existing OHL and IBA

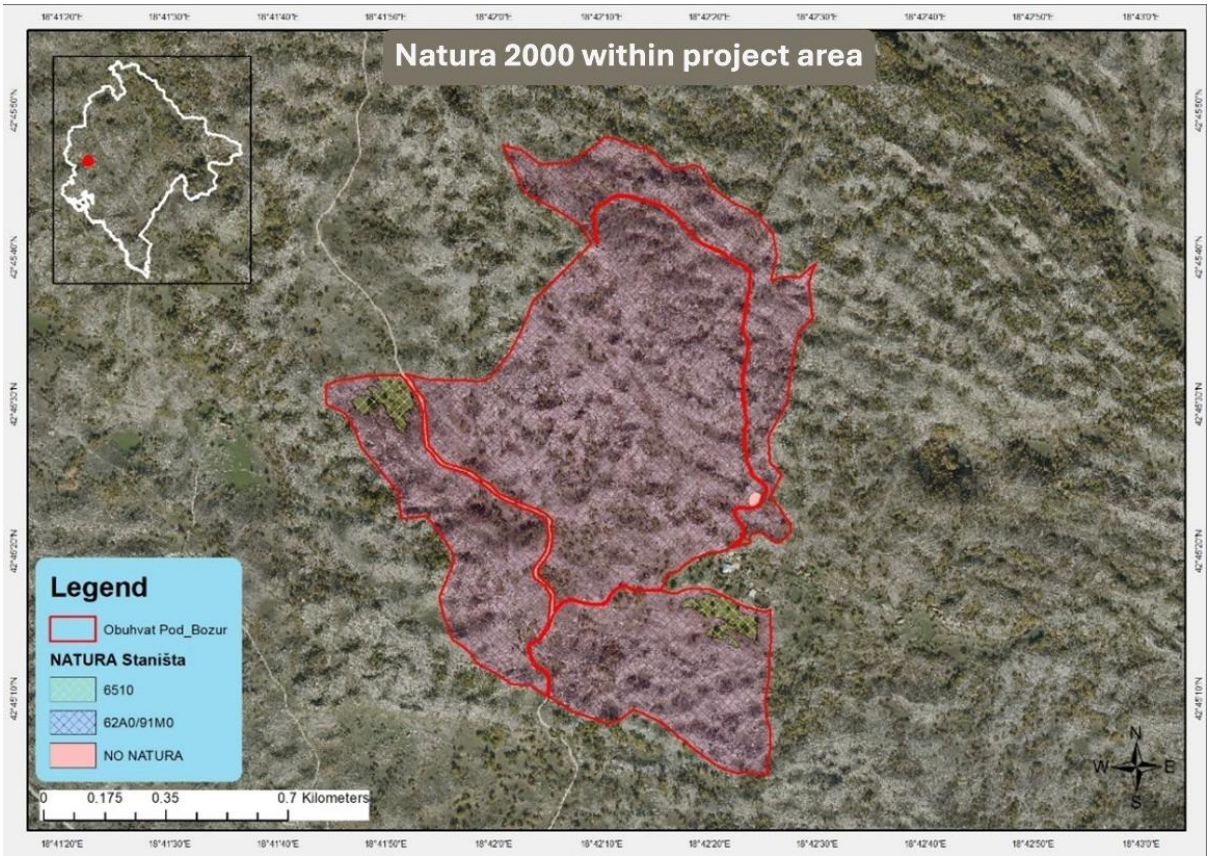

Figure 5-6: Natura 2000 within project area

Field surveys and literature data confirmed the presence of 29 bird species in the Rudine project area.

The overall diversity is relatively low, which correlates with the limited habitat heterogeneity of the karst plateau.

During the monitoring, 25 observation points were standardised and are presented graphically.

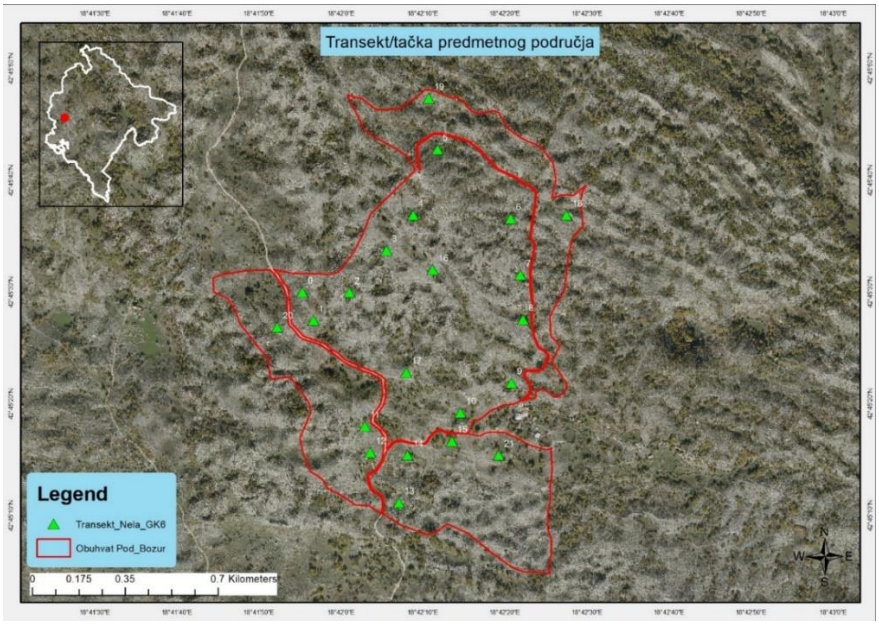

Figure 5-7: Observation points during the monitoring

According to Montenegrin legislation (Decision on the protection of rare, sparse, endemic and endangered species, OG 76/06), 25 species recorded are nationally protected.
In terms of international conventions and directives:

- *6 species are listed in Annex I of the EU Birds Directive (2009/147/EC): Accipiter gentilis, Bubo bubo, Circaetus gallicus, Dendrocopos syriacus, Fringilla coelebs, Lanius collurio.*
- *11 species are included in Annex II of the Bonn Convention: Circaetus gallicus, Falco tinnunculus, Luscinia megarhynchos, Bubo bubo, Oenanthe oenanthe, Saxicola rubetra, Streptopelia turtur, Sylvia communis, Sylvia cantillans, Turdus merula, Turdus viscivorus.*
- *All recorded species are listed under Annex III of the Bern Convention.*
- *4 species are included in CITES Appendix II: Accipiter gentilis, Bubo bubo, Circaetus gallicus, Falco tinnunculus.*

According to the IUCN Red List (global and national levels):

- *3 species are assessed as Vulnerable (VU) – Accipiter gentilis, Streptopelia turtur, Bubo bubo.*
- *1 species is assessed as Near Threatened (NT) – Streptopelia turtur.*
- *The majority of species are classified as Least Concern (LC).*

In addition, 1 species holds SPEC2 status (species of European conservation concern), while 9 species are classified as SPEC3.

Importantly, the area does not lie on a major migratory corridor for raptors or waterbirds, and no significant concentrations of migratory species were recorded. However, based on the conservation assessment, 11 species of special interest (protected under Birds Directive Annex I, Bonn Annex II, IUCN threat categories, or recognised as SPEC species) were identified as potentially sensitive to project development. These include both resident breeding species and migratory breeders whose local populations could be affected.

Potential project impacts on birds primarily relate to habitat loss, disturbance during construction, and potential foraging displacement, rather than large-scale collision or barrier effects. Targeted monitoring and mitigation measures will be developed in the ESIA to minimise risks for the identified species of concern.

Mammal Fauna

During field research conducted in April and May 2024, a total of 8 mammal species were recorded in the project area (Table 14), classified into 5 orders.

Table 5-3: Recorded mammal species in the project area of the planned development (legend: +/- species protected under national law (Official Gazette of Montenegro, No. 76/06); presence in: Bern – Bern Convention on the Conservation of European Wildlife and Natural Habitats; IUCN Red List)

Species (Latin / English name)	National protection status	International protection status
***Apodemus sylvaticus* – Wood mouse**	–	LC (IUCN)
***Sorex minutus* – Pygmy shrew**	–	LC (IUCN)
***Erinaceus roumanicus* – Northern white-breasted hedgehog**	–	LC (IUCN)
***Lepus europaeus* – European hare**	–	LC (IUCN)
***Martes foina* – Beech marten**	–	LC (IUCN), Bern (Appendix III)
***Sus scrofa* – Wild boar**	–	LC (IUCN)
***Talpa* sp. – Mole**	–	LC (IUCN)
***Vulpes vulpes* – Red fox**	–	LC (IUCN)

Taxonomic overview:

1. *Order Artiodactyla – even-toed ungulates: Wild boar (Sus scrofa).*
2. *Order Carnivora – terrestrial carnivores: Beech marten (Martes foina), Red fox (Vulpes vulpes).*
3. *Order Insectivora – insectivores: Pygmy shrew (Sorex minutus), Northern white-breasted hedgehog (Erinaceus roumanicus), Mole (Talpa sp.).*
4. *Order Lagomorpha – hares and rabbits: European hare (Lepus europaeus).*
5. *Order Rodentia – rodents: Wood mouse (Apodemus sylvaticus).*

Based on literature data for the wider area, the presence of **bats** *is considered possible (Table 5-4).*

Table 5-4: Recorded bat species in the Municipality of Nikšić (Presetnik P. et al., 2014) with national and international protection status (legend: +/- species protected under national law (Official Gazette of Montenegro, No. 76/06); species listed in: HD – EU Habitats Directive; Bern – Bern Convention on the Conservation of European Wildlife and Natural Habitats; Bonn – Bonn Convention on the Conservation of Migratory Species of Wild Animals (EUROBATS – an agreement under the Bonn Convention); IUCN Red List – Mediterranean)

Species (Latin / English name)	National protection status	International protection status
***Eptesicus serotinus* – Serotine bat**	+	LC (IUCN), Bonn Convention, EUROBATS
***Miniopterus schreibersii* – Common bent-wing bat**	+	NT (IUCN), Bern (App. II), Bonn Convention, EU Habitats Directive (Annex II), EUROBATS
***Myotis capaccinii* – Long-fingered bat**	+	VU (IUCN), Bern (App. II), Bonn Convention, EU Habitats Directive (Annex II), EUROBATS
***Myotis nattereri* – Natterer's bat**	+	LC (IUCN), Bern (App. II), Bonn Convention, EUROBATS
***Nyctalus noctula* – Common noctule**	+	LC (IUCN), Bern (App. II), Bonn Convention, EUROBATS
***Pipistrellus kuhlii* – Kuhl's pipistrelle**	+	LC (IUCN), Bern (App. II), Bonn Convention, EUROBATS
***Pipistrellus pipistrellus* – Common pipistrelle**	+	LC (IUCN), Bern (App. III), Bonn Convention, EUROBATS
***Plecotus macrobullaris* – Alpine long-eared bat**	+	NT (IUCN), Bern (App. II), EUROBATS
***Rhinolophus euryale* –**	+	VU (IUCN), Bern (App. II), Bonn Convention, EU

Mediterranean horseshoe bat		Habitats Directive (Annex II), EUROBATS
***Rhinolophus ferrumequinum* – Greater horseshoe bat**	+	NT (IUCN), Bern (App. II), Bonn Convention, EU Habitats Directive (Annex II), EUROBATS
***Rhinolophus hipposideros* – Lesser horseshoe bat**	+	NT (IUCN), Bern (App. II), Bonn Convention, EU Habitats Directive (Annex II), EUROBATS

Bats are globally threatened mammals enjoying extensive international protection. They are the only mammals capable of true flight and serve as natural regulators of nocturnal insect populations. Their presence is considered an indicator of a well-preserved environment. All bat species in Montenegro are protected under national legislation (Official Gazette of Montenegro, No. 76/2006).

5.7.3. Flora and Habitats for Vilusi location

Based on field research conducted at the Vilusi site, the presence of habitat type **62A0 – Eastern sub-Mediterranean dry grasslands (Scorzoneretalia villosae)** *was recorded at the project location, with* **poor representativity**. *Intensive grazing was observed in the lower part of the meadow.*

Xerophilous grasslands of the sub-Mediterranean zone *are habitats found in areas with a moderate Mediterranean climate, sharing space with steppe communities of the order Festucetalia valesiacae (6210). This habitat type develops under less continental conditions and is characterised by a significant presence of plant species typical of Mediterranean regions.*

These xerophilous sub-Mediterranean grasslands include a variety of grassland types that thrive under sub-Mediterranean climatic conditions and contain dominant plant species characteristic of these environments. They are most commonly found in areas where hop hornbeam (Ostrya carpinifolia) forests prevail, but they can sometimes extend to lower altitudes, where they mix with holm oak (Quercus ilex) forests. In favourable locations, these grasslands can spread further inland and reach higher altitudes, where they intermingle with beech forests (Fagus sylvatica).

These grasslands are typically dominated by **perennial herbaceous species**, *often with low shrub cover, but numerous geophytes and some annual species can also occur. In addition, many indicator species — particularly grasses — are present, which also occur in other habitat types (6210, 6220). The floristic composition of the community varies depending on slope, soil skeleton content, moisture, and soil depth.*

The plant species recorded during field research are listed in the table below.

Table 5-5: Overview of plant species collected during field research (species listed under the Habitats Directive and IUCN Red List – Mediterranean)

LATIN NAME	IUCN
***Cirsium europhorum* (L.) Scop.**	-
***Petrorhagia saxifraga* (L.) Link.**	-
***Euphorbia cyparissias* L.**	-
***Fraxinus ornus* L.**	LC
***Erigeron acris* L.**	-
***Medicago sativa* L.**	LC
***Centaurea paniculata* L.**	DD
***Echium vulgare* L.**	-
***Mentha longifolia* (L.) L.**	LC
***Trifolium medium* L.**	-
***Verbena officinalis* L.**	LC
***Artemisia absinthium* L.**	LC
***Pimpinella saxifraga* L.**	-
***Salvia sclarea* L.**	-
***Capsella bursa-pastoris* (L.) Medik.**	LC

***Clematis vitalba* L.**	-
***Trifolium alpestre* L.**	LC
***Lathyrus hirsutus* L.**	LC
***Scrophularia canina* L.**	-
***Bothriochloa ischaemum* (L.) Keng.**	-
***Eryngium amethystinum* L.**	-
***Colchicum autumnale* L.**	LC
***Lotus corniculatus* L.**	LC
***Achillea millefolium* L.**	LC
***Sesleria autumnalis* (Scop.) F.W.Schultz**	LC
***Dorycnium pentaphyllum* subsp. *germanicum* (Gremli) Gams**	-
***Fraxinus ornus* L.**	LC
***Arrhenatherum elatius* (L.) P.Beauv. ex J.Presl & C.Presl**	LC
***Scabiosa ochroleuca* L.**	-
***Bellis annua* L.**	-
***Betonica officinalis* L.**	LC
***Centaurea jacea* L.**	-
***Rosa canina* L.**	LC
***Quercus cerris* L.**	LC
***Quercus petraea* (Matt.) Liebl.**	LC
***Dactylis glomerata* L.**	-
***Clematis vitalba* L.**	-
***Plantago lanceolata* L.**	LC
***Crataegus monogyna* Jacq.**	LC
***Fragaria vesca* L.**	LC
***Cichorium intybus* L.**	LC
***Clinopodium vulgare* L.**	-
***Corylus avellana* L.**	LC
***Cyclamen purpurascens* Mill.**	LC
***Echium vulgare* L.**	-
***Prunus spinosa* L.**	LC
***Galanthus nivalis* L.**	NT
***Linaria vulgaris* Mill.**	-
***Silene vulgaris* (Moench) Garcke**	LC
***Euonymus europaeus* L.**	LC
***Rubus ulmifolius* Schott**	-
***Dianthus carthusianorum* L.**	-
***Agrimonia eupatoria* L.**	LC
***Arum maculatum* L.**	-

A total of **30 species** *listed on the* **IUCN Red List** *were recorded in the surveyed area. Out of 54 recorded taxa, one taxon is classified as* **Data Deficient (DD)**, *one taxon as* **Near Threatened (NT)**, *and the remaining 28 taxa as* **Least Concern (LC)**. *It should be noted that these species are* **widely distributed**, *so the construction of the proposed solar power plant is* **not expected to pose a threat** *to their populations.*

At the site, the **upper shrub layer** *is dominated by* **Turkey oak (*Quercus cerris*)**. *Although this species is abundant, the forest is not dense; rather, it is a sparse and degraded stand interspersed with*

meadows. In the same layer, shrub vegetation occupies a smaller area but is richer in flora. Species such as Rosa canina, Cornus mas, Crataegus monogyna, and Rubus ulmifolius are present.

In the lower part of the study area, as a result of the **degradation of Turkey oak shrubland***,* **permanent vegetation stages** *have developed, characterised by* **dry rocky pastures (Scorzoneretalia villosae)** *dominated by Eryngium amethystinum. The* **productivity potential** *of these low forests and shrublands is reduced, and they are not highly productive. These areas are therefore* **susceptible to ecological changes and degradation***, which affects their ability to maintain the typical characteristics of a forest ecosystem.*

Within the project area, the only **species of national interest** *listed in the Decree on the Protection of Certain Plant and Animal Species (Official Gazette of Montenegro, No. 76/06) is Galanthus nivalis L. It is important to note that this species is* **widely distributed throughout Montenegro***, with* **stable populations***, and cannot be considered threatened either at the study site or at the national level.*

The habitats recorded during the field research are **to some extent influenced by anthropogenic activities***.*

Invertebrates

During the site visit in mid-September, it was observed that the location had been mowed, followed by intensive grazing. A review of the available scientific and expert literature revealed that the invertebrate fauna of the project area and the wider surroundings has not been investigated, and therefore data on the presence of species and their temporal and spatial distribution are lacking.

Taking into account the wider surroundings of the surveyed area and the presence of the previously mentioned plant communities, it can be concluded that **representatives of almost all insect groups** *(Coleoptera, Diptera, Hemiptera, Hymenoptera, Lepidoptera, Neuroptera, Mantodea, Odonata, Orthoptera) can be found at the site.*

The following **butterfly species** *were recorded during the field visit:*

Aricia anteros, Brinthesia circe, Coenonympha pampilus, Colias croceus, Lysandra coridon, Maniola jurtina, Pieris mannii, Pieris napi, Polyommatus icarus, Polyommatus tersites, Pyrgus malvae.

In the wider area, the following butterfly species were also observed: Genopteryx rhamni, Hipparchia volgensis and Polygonia c-album.

Based on previous research by the author of this report, the following species have been recorded in the wider area of the project site: Aporia crateagi, Brenthis daphne, Favonius quercus, Melanargia galathea, Vanessa atalanta and Vanessa cardui.

Among other insects observed at the site were:

Cetonia aurata, Carabus problematicus, Pholidoptera griseoaptera, Spilostethus saxatilis, Oedipoda caerulescens.

The snail species Cernuella virgata was recorded at the site.

Within the NATURA 2000 species mapping project, the following species were identified in the wider area of the Municipality of Nikšić:

Insects

- *PP Orjen – Grahovo area: Buprestis splendens, Morius funereus, Rosalia alpina, Morius funereus, Cerambyx cerdo, Lucanus cervus, Euphydryas aurinia, Phengaris arion, Euplagia quadripunctaria, Saga natoliae*
- *Nudo area: Callimorpha quadripunctaria*

Arthropoda

- *Grahovo area: Clinopodes flavidus*

Molluscs (snails)

- *Grahovo: Cochlostoma auritum*

Among these species, Rosalia alpina and Lucanus cervus are protected under the Decree on the Protection of Certain Plant and Animal Species (Official Gazette of Montenegro, No. 76/2006).

Mammals

During the site survey, the presence of the following mammal species was recorded: red fox (Vulpes vulpes), European badger (Meles meles), European hedgehog (Erinaceus europaeus), and mole (Talpa sp.). In the nearby surroundings, the following were observed: wild boar (Sus scrofa), edible dormouse (Glis glis), shrew (Sorex sp.), and European hare (Lepus europaeus).

According to literature data, Montenegrin vole (Pitymys thomasi) has also been recorded in the Vilusi area (Marić & Rakočević, 2010).

None of the above-mentioned species are protected at the national or international level.

Within the NATURA 2000 species mapping project, the following species were identified in the wider area of the Municipality of Nikšić:

- *Njegoš area: Brown bear (Ursus arctos) and chamois (Rupicapra rupicapra)*
- *PP Orjen – Grahovo area: Brown bear (Ursus arctos) and wolf (Canis lupus)*
- *PP Orjen – SE Tupan – SE Stražište area (bats): Miniopterus schreibersii (Schreiber's bat), Myotis nattereri (Natterer's bat), Rhinolophus ferrumequinum (greater horseshoe bat), Rhinolophus hipposideros (lesser horseshoe bat).*

All bat species are protected under the Decree on the Protection of Certain Plant and Animal Species (Official Gazette of Montenegro, No. 76/2006).

The following table shows the conservation status of the bat species according to national legislation, international conventions, and EU directives:

Table 5-6: Bat species and their protection status

Species	National protection status	International protection status
***Miniopterus schreibersii* (Schreiber's bat)**	+	*NT (IUCN), Bern (Appendix II), Bonn, EU Habitats Directive (Annex II), EUROBATS*
***Myotis nattereri* (Natterer's bat)**	+	*LC (IUCN), Bern (Appendix II), Bonn, EU Habitats Directive (Annex II), EUROBATS*
***Rhinolophus ferrumequinum* (greater horseshoe bat)**	+	*NT (IUCN), Bern (Appendix II), Bonn, EU Habitats Directive (Annex II), EUROBATS*
***Rhinolophus hipposideros* (lesser horseshoe bat)**	+	*NT (IUCN), Bern (Appendix II), Bonn, EU Habitats Directive (Annex II), EUROBATS*

Batracho and Herpetofauna

Due to **time constraints of the field research**, *only* **one individual of *Ophisaurus apodus* (European glass lizard)** *and* **one individual of *Podarcis muralis* (common wall lizard)** *were recorded.*

Other reptile species expected to occur in the area include:

- *Lacerta viridis (green lizard)*
- *Anguis fragilis (slow worm)*
- *Lacerta trilineata (Balkan green lizard)*
- *Zamenis longissimus (Aesculapian snake)*

The area is hydrologically dry, with no surface springs, which explains the limited presence of amphibians. Expected amphibian species include Bufo bufo (common toad) from the order Anura.

Although the batracho- and herpetofauna species present or potentially occurring at the site are listed as legally protected in Montenegro, there are no data indicating that their populations are threatened.

5.8. Protected Areas

Within the territory of the Municipality of Nikšić, three natural sites have been designated for protection:

1. **Arboretum – Botanical Garden of the Kovačević family in Grahovo**, *protected as a Natural Monument;*
2. **Trebjesa Forest**, *designated as a Landscape of Exceptional Characteristics and an important IPA habitat;*
3. **Gornjepoljski vir**, *protected as a Natural Monument and recognised as the largest estavelle in the Dinarides.*

None of the above-mentioned protected natural sites are located within or in the immediate surroundings of the planned Rudine Solar Power Plant.

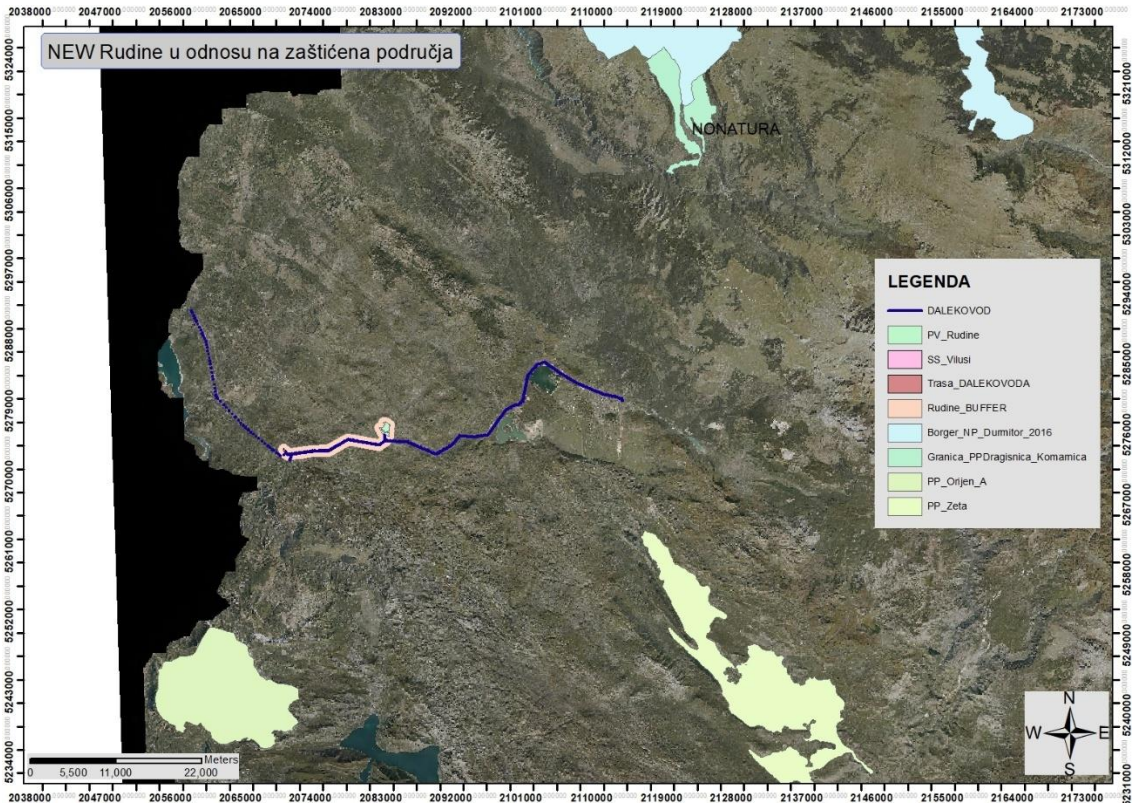

Figure 5-8: SPP Rudine, OHL and protected areas

5.9. Landscape

According to the Mapping and Typology of Landscapes of Montenegro[13], the Rudine area is located within the Karst region of Montenegro. This region is characterised by thick layers of carbonate rocks, predominantly limestone, with strongly developed karst erosion, poor soil cover, and limited water availability. The geomorphological and climatic conditions of this karst plateau shape the ecological sensitivity and land use potential of the project area.

The ring of coastal mountains prevents the direct thermal influence of the Adriatic Sea. However, the amount of precipitation is high due to the penetration of humid Mediterranean air masses through the Bay of Kotor. Average annual precipitation varies significantly in the wider area: Cetinje – 3,993 l/m², Grahovo – 3,140 l/m², Nikšić – 1,993 l/m², and Crkvice – 4,742 l/m².

The karst region extends north of the Orjen–Lovćen–Sutorman–Rumija mountain chain, reaching up to the Duga Gorge–Nikšić line. Within this zone, several limestone mountains rise, including Somina, Njegoš, Golija, Plješevice, and Budoša. The landscape is further structured by large karst plateaus and fields such as Cetinje, Njeguši, Dragalj, Grahovo, Nudo, and Nikšić.

The Rudine plateau itself is a **typical karst landscape***, consisting of open grasslands, scattered shrubs, sinkholes (dolines), and rocky outcrops. Settlement patterns are dispersed, with low population density and limited agricultural potential due to scarce water resources. Despite these limitations, the area holds potential for livestock farming and small-scale use of medicinal and aromatic plants, while stone extraction has historically shaped parts of the landscape.*

The deep karst surface generally has a **thin and fragmented soil cover***, with fertile land occurring mostly at the bottoms of dolines, sinkholes, and valleys, or on isolated dolomitic plateaus. As a result, agricultural land is patchy and often marginal. The karst region is considered ecologically sensitive, owing to its limestone and limestone–dolomite substrate, degraded and fragile forest and grassland ecosystems, and pronounced erosion processes driven by high rainfall.*

The landscape of Rudine is defined by a mosaic of open grasslands, scattered forest patches, rocky plateaus, and karst depressions, creating a visually diverse but ecologically fragile environment. The presence of anthropogenic features, such as cisterns (bistjernes), dry-stone walls, and extensive pastures, reflects long-standing adaptation to harsh natural conditions.

The planned solar power plant will be located within this open karst setting, which is sparsely populated and characterised by minimal infrastructure, yet valued for its traditional land use, cultural features, and ecological significance.

At the regional level, based on the Mapping and Typology of Landscapes of Montenegro, the project site belongs to Section 3.4 – Mountainous areas of the Nikšić region. At the local level, the site is categorised under Section 3.4.2 – Mountainous areas of Rudine and Banjani. See Figure 5-9.

[13] https://www.gov.me/en/documents/bc1290b5-2461-479e-9206-c4a505ef28f3

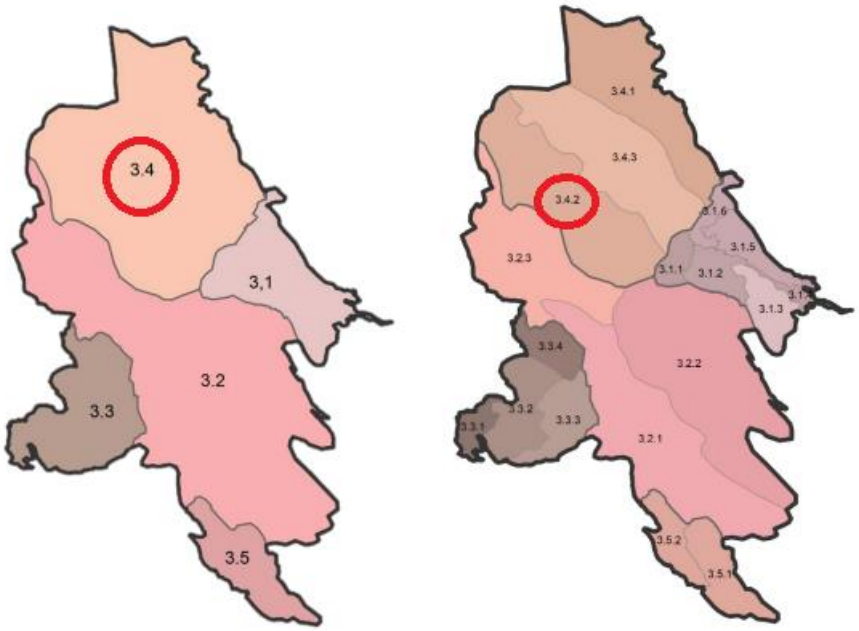

Figure 5-9: Regional (left) and local (right) level of landscape characteristics

Rudine is an area of dispersed and sparse settlements, with limited agricultural potential and typical karst landscapes marked by severe water supply constraints. Despite infrastructural limitations, the area holds significant development potential. It offers opportunities for livestock farming, which could support the establishment of small-scale processing plants as well as facilities for packaging medicinal herbs and other organic products. Additionally, the region has potential for the exploitation of construction stone.

The landscape of Rudine is characterised by scattered structures across wide areas, interspersed with forested and open valley spaces. In the valleys, alongside open meadows, karst sinkholes (dolines) represent a distinctive landscape feature.

5.10. Environmental Quality and Pollution

5.10.1. Air Quality

In accordance with European and national legislation in the field of air protection, for the purpose of monitoring and assessing air quality, the territory of Montenegro has been divided into three air quality zones. The municipality of Nikšić belongs to the central zone.

Continuous automatic monitoring of air quality in Nikšić has been carried out since mid-2009. The initial location of the automatic monitoring station was in Nika Miljanića Street (across from the hospital) until March 2012, after which a new location was established in the courtyard of the Stojan Cerović Gymnasium, in line with the Decree on establishing the network of measurement sites for air quality monitoring (Official Gazette of Montenegro, Nos. 44/10 and 13/11).

Measurements, data processing, and analysis of air quality have been performed in accordance with:

- ✓ *Law on Air Protection (Official Gazette of Montenegro, Nos. 25/10, 40/11, 43/15, 73/2019 and 84/2024),*

- ✓ *Decree on defining pollutants, limit values, and other air quality standards (Official Gazette of Montenegro, No. 25/12),*
- ✓ *Rulebook on the manner and conditions for air quality monitoring (Official Gazette of Montenegro, Nos. 21/11, 32/16),*
- ✓ *Decree on establishing the network of measurement sites for air quality monitoring (Official Gazette of Montenegro, Nos. 44/10, 13/11, 64/18).*

Within project area and its air quality zone, monitoring equipment has also been installed in the locality of Velimlje, as part of the EMEP programme (monitoring transboundary transport of air pollutants), under the responsibility of the Institute of Hydrometeorology and Seismology.

Sulphur Dioxide (SO_2)

Between 2013 and 2023, no exceedances of SO_2 limit values were recorded in Nikšić. The legal thresholds are defined on an hourly basis (200 µg/m³, maximum 18 exceedances per year) and on a daily basis (125 µg/m³, maximum 3 exceedances per year). Concentrations remain low due to the absence of large facilities burning high-sulphur fuels.

Nitrogen Dioxide (NO_2)

Annual average concentrations of NO_2 remained below the limit of 40 µg/m³. Hourly concentrations also did not exceed the threshold of 200 µg/m³ (maximum 18 exceedances per year). The main sources are traffic and domestic heating during winter, but critical concentrations were not recorded.

Ground-level Ozone (O_3)

The maximum daily 8-hour average concentrations were compared against the target value of 120 µg/m³, which should not be exceeded more than 25 times per year, calculated as a three-year average. Episodic peaks occur during summer due to photochemical reactions, but they are not frequent.

Carbon Monoxide (CO)

All recorded maximum 8-hour average concentrations were below the limit of 10 mg/m³. CO is not a significant issue in Nikšić due to the lack of intensive traffic and large emission sources.

Particulate Matter – PM_{10}

This is the most critical air pollutant for Nikšić. Daily concentrations of PM_{10} frequently exceeded the prescribed limit of 50 µg/m³ (with a maximum of 35 days per year allowed). Although the situation has improved compared to 2013, the number of exceedance days remains well above the permitted level. The main sources include solid fuel heating, transport, industry, and resuspension of dust.

Benzo(a)pyrene and Heavy Metals in PM_{10} (Pb, Cd, As, Ni)

The annual average concentration of benzo(a)pyrene was 3 ng/m³, which is above the target value of 1 ng/m³. Its sources include biomass combustion, domestic heating, industry, transport, and wildfires. Heavy metals are monitored in line with regulations, and while concentrations are generally below the limit values, continued monitoring is required.

Particulate Matter – $PM_{2.5}$

Measurements indicate significant pollution with $PM_{2.5}$, especially during the winter season. The limit value of 20 µg/m³ (EU Directive 2008/50/EC) has been in force since 2020. In 2022, only 6 days of measurements were recorded (due to equipment malfunction), which is below the minimum required for a full air quality assessment.

For Nikšić, the main air quality challenges are PM_{10}, $PM_{2.5}$, and benzo(a)pyrene, while SO_2, NO_2, and CO remain well below the limit values. Ozone occasionally peaks in summer but does not frequently exceed regulatory thresholds. In the Rudine rural plateau, baseline air quality is expected to be

significantly better than in the urban core of Nikšić, with fewer anthropogenic sources of pollution.

5.10.2. Water pollution

Groundwater

Monitoring of 32 groundwater bodies was carried out in 2023 (including 6 springs, 3 dug wells, and 23 new boreholes). The assessment followed the Rulebook on Groundwater Status (Official Gazette of Montenegro 52/2019) and relevant chemical status parameters.
Most sampling points indicated **good to very good quality** *based on basic physico-chemical parameters (pH, BOD_5, conductivity, nitrates, phosphates, etc.). Occasional detection of pollutants such as* **lead** *(0.21 µg/l) was recorded, while arsenic, cadmium, mercury, and pesticides were generally below detection limits.*

Microbiological analyses at some locations indicated the presence of coliform bacteria (425–460/100 ml), fecal coliforms (3–14/100 ml), and live bacterial counts (25–76/ml). Certain boreholes (e.g. Zaljutnica in Golija) were assessed as **moderate to poor status** *due to elevated values of BOD_5, total phosphorus, and TOC.*

Surface Water

There are **no natural surface water bodies** *within or immediately adjacent to the Rudine project area. Within the project footprint itself (parcel no. 797, KO Rudine), there is only a small* **artificial pond** *constructed for livestock watering, which is now occasionally used for agricultural irrigation. The nearest larger water body is the* **Slano Reservoir**, *located approximately 10 km from the site.*

The Rudine plateau is a typical karst region with highly permeable limestone, limited surface water, and challenging water supply conditions. Groundwater quality is variable, but generally assessed as good, while surface water bodies are scarce and not a limiting factor for project development.

5.10.3. Soil pollution

Soil monitoring and testing of hazardous substances in Montenegro is conducted in line with the Law on Environment (Official Gazette of Montenegro 52/16, 73/19), the Law on Agricultural Land (OG RCG 15/92, 59/92, 27/94; OG MNE 73/10, 32/11), and the Rulebook on Maximum Allowed Concentrations of Hazardous and Harmful Substances in Soil (OG RCG 18/97). Monitoring is also harmonised with the requirements of the Stockholm Convention on Persistent Organic Pollutants (POPs).

The programme includes analysis of heavy metals (Cd, Pb, Hg, As, Cr, Ni, F, Cu, Mo, B, Zn, Co), as well as sequential extraction methods which provide better insight into the remobilisation potential of these elements in soils.

Soils in the wider Nikšić area show localised exceedances of heavy metals and organic pollutants, particularly near industrial and landfill sites. However, most elevated concentrations are linked to the natural geochemical composition of karstic terrain rather than anthropogenic contamination. Within the Rudine project site itself, no soil contamination hotspots have been identified, and baseline conditions are consistent with a typical karst plateau, characterised by shallow, rocky, and low-fertility soils.

5.10.4. Noise and vibration

The wider Rudine project area is characterised as a rural karst plateau, consisting mainly of pastures, shrublands, and abandoned agricultural land, with very limited economic activities. There are no industrial or infrastructure facilities that would act as significant sources of noise or vibration. The only potential contributors to ambient noise are everyday activities of local residents and occasional agricultural or traffic movements along local roads.

The Environmental Impact Assessment (EIA) confirms that no significant noise sources exist within or near the project footprint. Baseline conditions can therefore be considered as representative of a typical rural environment with low background noise levels, generally within the thresholds recommended by the World Health Organization (WHO) for outdoor rural areas (40–45 dB daytime, <35 dB nighttime).

No vibration-generating activities are present in the area. Given the karst geological setting and the absence of heavy industry or transport corridors, baseline vibration levels are negligible.

As part of the ESIA process, targeted baseline noise measurements will be conducted at the nearest settlements that could potentially be affected during construction works. These measurements will establish reference values and ensure that project activities remain within applicable national and EBRD standards for noise and vibration.

5.11. Socio-Economic Baseline

5.11.1. Demography, Population and Public Services

According to the results of the 2011 census, the Municipality of Nikšić had 72,824 inhabitants, representing 11.6% of the total population of Montenegro. Of this number, 57,278 lived in the urban area, 63,280 in the Nikšić Field including the town, 3,731 in Župa Nikšićka, 424 in the southern zone with Bogetići, 1,638 in the western zone, and 485 in the northern zone.

Between 1991 and 2003, the population of the municipality increased by 1,404, while in the following census period it decreased by 2,458. During the same periods, the urban population increased by 2,563 and then decreased by 1,242. In the observed period, only the rural settlements in the Nikšić Field showed continuous population growth—500 in the first period and a much smaller increase of 55 in the second—mainly due to the growth of three settlements: Miločani, Ozrinići, and Rastovac. Other parts of the municipality experienced continuous population decline, with the intensity of depopulation accelerating in the most recent inter-census period.

The following diagram illustrates that the population of the Municipality of Nikšić has been in continuous decline from 2011 to 2023.

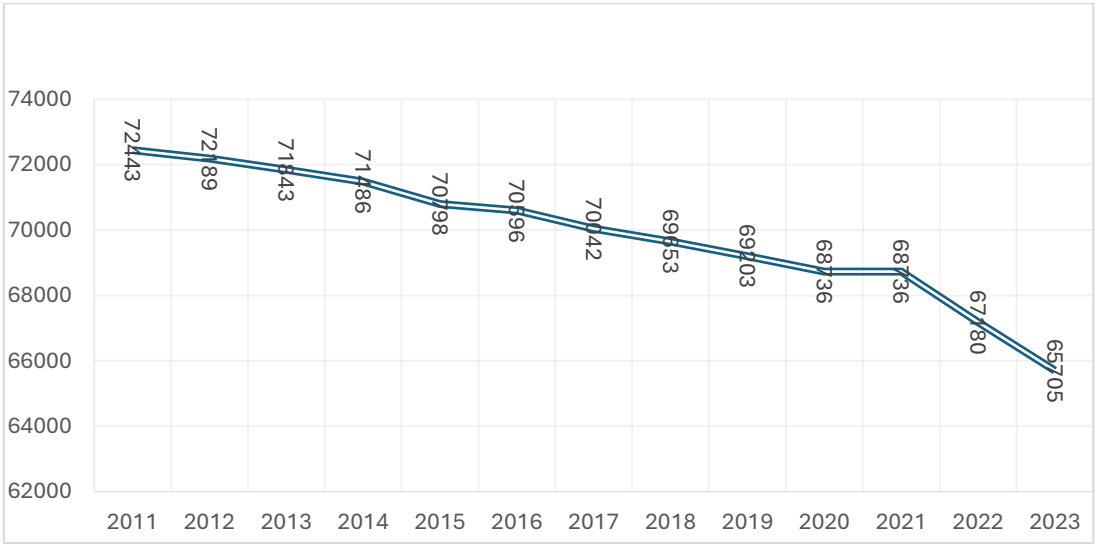

Figure 5-10: Number of inhabitants in the municipality of Nikšić[14]

The population density is 36.45 inhabitants/km², which classifies the Municipality of Nikšić among

[14] https://www.monstat.org/cg/page.php?id=222&pageid=57

municipalities with a medium population density. This figure is 1.23 times lower than the national average density of Montenegro, which amounts to 44.8 inhabitants/km².

The natural population growth rate in the Municipality of Nikšić has been in constant decline, as shown in the following Table 5-7.

Table 5-7: Natural population growth in the Municipality of Nikšić (2017–2023)

Year	Birth rate (‰)	Mortality rate (‰)	Natural increase (‰)
2017	9.2	12.1	-2.9
2018	8.8	12.7	-3.9
2019	8.4	12.5	-4.1
2020	7.6	13.4	-5.8
2021	7.2	15.1	-7.9
2022	6.9	14.8	-7.9
2023	~7.0	~12.6	-5.6 (est.)

According to the results of the 2023 Census, the cadastral municipality (KO) Rudine has a total population of 18 inhabitants, distributed across 10 households and 28 dwellings. This reflects the broader trend of extreme depopulation and ageing in rural areas of Nikšić municipality, where settlements are sparsely populated and characterised by limited economic activity and underutilised housing stock.

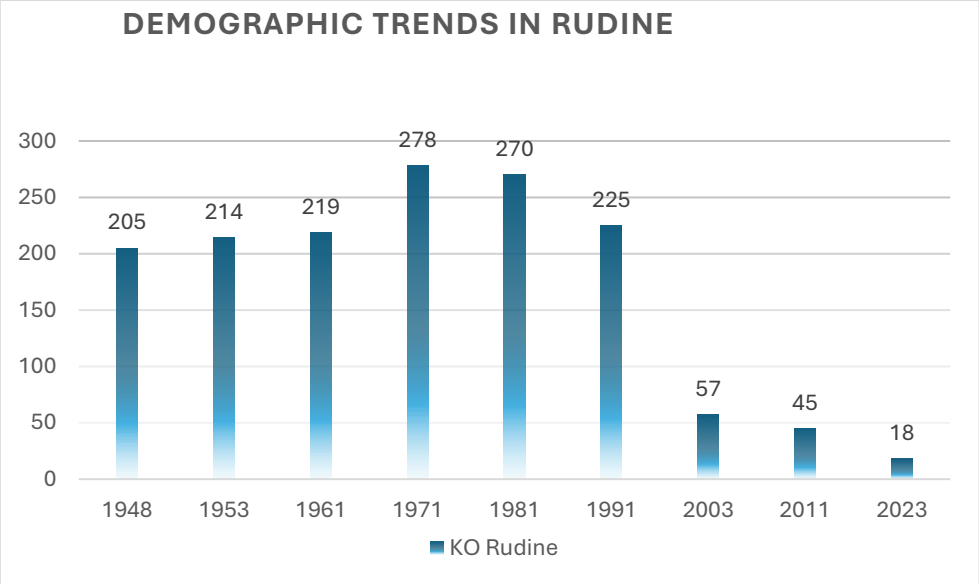

Figure 5-11: Demographic trends in LC Rudine

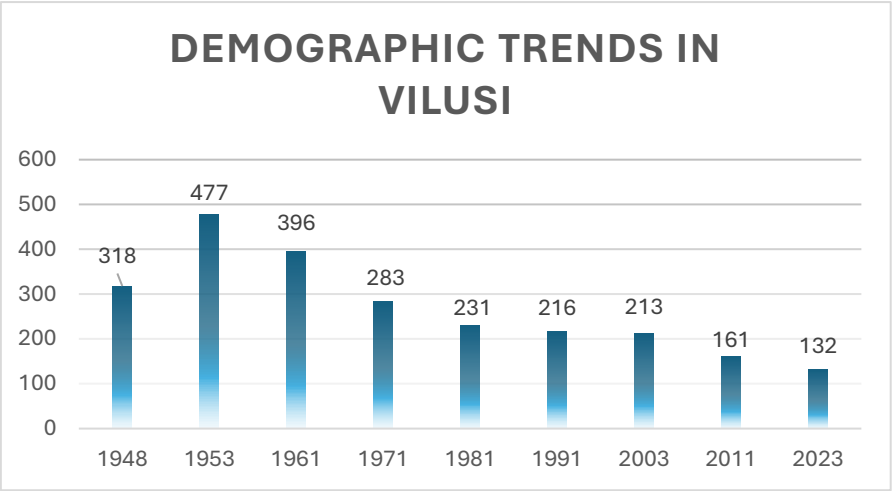

Figure 5-12: Demographic trends in LC Rudine

According to the 2024 Census of Agriculture, the Municipality of Nikšić has 3,187 agricultural holdings and over 15,600 hectares of utilised agricultural land. The overwhelming majority of this land consists of meadows and pastures (over 90%), confirming the traditional importance of livestock farming in the region.

Cattle and sheep breeding dominate the livestock sector, with 11,520 cattle (including nearly 7,000 dairy cows) and 26,755 sheep, of which 18,830 are breeding sheep. Goat farming is also notable, with close to 8,800 animals, while pig farming is modest in comparison, with just over 10,000 pigs. Poultry production is significant, counting more than 613,000 birds, primarily laying hens. Beekeeping is also present, with nearly 13,000 beehives recorded.

Overall, the data indicate that agriculture in Nikšić is predominantly extensive and livestock-oriented, with limited areas of arable land, orchards, and vineyards. This reflects both the karstic geography and socio-economic conditions of the Rudine plateau and surrounding rural zones.

Table 5-8: Agricultural resources in the Municipality of Nikšić (2024 Census of Agriculture)

Indicator	Value
Number of agricultural holdings	3,187
Utilised agricultural land (total)	15,653.2 ha
- Meadows and pastures	14,207.5 ha
- Arable land	1,087.4 ha
- Orchards (plantations + extensive)	261.6 ha
- Vineyards	12.9 ha
Number of livestock units (LU)	24,254.4
Cattle (total)	11,520
- of which dairy cows	6,976
Sheep (total)	26,755
- of which breeding sheep	18,830
Goats (total)	8,778
- of which breeding goats	5,710
Pigs (total)	10,308
- of which breeding sows	654
Poultry (total)	613,263
- of which laying hens	588,617
Beehives	12,971

During the site visit to the planned SE Rudine location, carried out on 20 October 2024, interviews were conducted with local residents at two locations. The first location, at a distance of about 25 m from the project site, consists of a cluster of houses, auxiliary buildings, and barns to the east of the project area. The second location refers to households situated approximately 180 m to the west of the project boundary.

At the first location, an interview was conducted with D.P., 68 years old, the owner of a property with a building located 55 m from the project boundary. He does not reside permanently at this property but lives in Kličevo, visiting Rudine occasionally to maintain his land. None of the other houses at this location are permanently inhabited; the owners only occasionally visit their properties, which in the meantime have become neglected. On two nearby plots, onions and potatoes are cultivated for personal use. This location, which once had dozens of inhabitants, is now depopulated, with no permanent residents, as confirmed by the most recent Census of Montenegro.

At the second location, an interview was carried out with D.P. and his brother, both between 60 and 70 years old, who are permanently settled there. They make their livelihood through agricultural activities and part-time work in the town of Nikšić. This household keeps two cows and several chickens.

None of the residents interviewed expressed opposition to the project or voiced any negative opinions.

A survey of the entire project area did not identify any other households within a 200 m corridor from the project boundaries.

There are no civil society organizations active in the settlement.

5.12. Historical and Cultural Heritage

The cultural landscape represents a part of the environment where human activities have created recognizable forms that testify to history, culture, and heritage in harmony with nature. As such, it should be identified, preserved, and protected. Spatial planning documents have recognised areas of exceptional value for maintaining the cultural landscape identity of the municipality. These include: Bedem Fortress, Carev Bridge, Roman Bridge, Church of St. Elijah on Planik, Golo Brdo, Monastery of St. John the Baptist (Jovan Do), Kosijerevo Monastery, and Monastery of St. Luke in Župa.

Neither within the immediate vicinity nor in the wider area surrounding the planned SE Rudine site are any of the above-mentioned cultural and historical assets located.

6. Potential Impacts and Mitigation Measures

6.1. Introduction

Potential impacts and mitigation measures presented in the following tables represent a list of the main potential environmental, socioeconomics and cultural heritage impacts for the construction, pre-commissioning and operation of the project. The tables contain the following information:

- *Impact Area: list of segments of natural and social environment represented by the environmental, socioeconomic and cultural heritage components potentially affected by the project's activities during construction, pre-commissioning and operation phases. Impact areas include:*
    - *Resources and Waste;*
    - *Geology, Soils and Contaminated land;*
    - *The Water Environment;*

- *Air Quality and Climatic factors;*
- *Noise and Vibration;*
- *Biodiversity and Nature Conservation;*
- *Landscape and Visual Impacts;*
- *Socio-Economic Impacts;*
- *Displacement of Land Uses,*
- *Property and People;*
- *Community Health and Safety;*
- *Working Conditions;*
- *Cultural Heritage.*

- *Potential Impacts of Significance: represent the list of types of impact or sources of impacts that could occur from the project activities on the basis of information that are available in the scoping face (project and baseline). The significance and magnitude of the impacts with exact description, which should include what is being affected and how, will be further examined and ascertained during the detailed impact assessment;*

- *Area of Influence: the effective geographical area, which could be potentially affected by the impacts. The definition of the area of influence is to be intended as indicative. The extent of the area, the physical and spatial size of the impact of influence, will need to be further examined and ascertained during the detailed impact assessment;*

- *Mitigation Options: list of types of mitigation and control measures that may be considered where significant impacts are identified during the assessment.*

With regard to the Area of Influence, the following criteria have been adopted:

- ✓ *Local – impacts that affect local environmental, socioeconomic or cultural heritage resources or are restricted to a single habitat/biotope, a single (local) administrative area or a single community. Although considered local, the geographical extent of each impact within this category can be variable, depending on the impact type and location. Local impacts may be restricted to the working strip and areas directly affected by associated facilities (e.g. access roads, workers camps and cable line), however there will be local impacts that extend beyond but are still within the local context (e.g. within hundreds of meters or kilometric distances from the Right of Way).*

- ✓ *Regional – impacts that affect regional environmental, socioeconomic or cultural heritage resources or are felt at a regional scale as determined by habitat type, administrative boundaries or community. Tentatively the geographical extent of regional impacts will be up to tens of kilometres.*

- ✓ *National – impacts that affect national environmental, socioeconomic or cultural heritage resources or affect an area that is nationally protected/ important. Tentatively the geographical extent of national impacts will be up to hundreds of kilometres.*

- ✓ *Trans-boundary/International/Global – impacts that are experienced in one country (or several countries) as a result of activities in another, which in some occasions could reach to planetary level (e.g. global warming).*

6.2. Construction

Table 6-1: Potential Environmental Impacts and Mitigation Measures Related to Project Construction and Pre-Commissioning

Impact Area	Potential Impact / Source	Area of Influence	Potential Preventive / Mitigation Measures
Resources and Waste	• *Use of large quantities of construction materials* • *Disposal of construction waste* • *Transportation of construction material and waste* • *Sewage (black and grey water) management and disposal* • *Consumption of fuel by vehicles and machinery* • *Use of water for construction activities, camps, yards*	*Local to regional, depending on origin of construction material, location of waste disposal sites, and fuel sourcing*	• *Materials to be sourced and disposed of with sustainable procurement principles and from as close as possible to the project area - so as to minimise impacts of production and transport.* • *Identify beneficial uses or opportunities for re- cycling construction spoil and other wastes wherever possible.* • *Waste management plan and system to be implemented* • *Environmental and social management plan*
Geology, Soils and Contaminated Land	• *Excavation, land development, quarrying* • *Clearance of vegetation affecting topsoil with risk of erosion and loss* • *Soil compaction and accidental contamination (oil, fuel, chemicals)* • *Clearance of vegetation in PV plant area and OHL working strip, logistic sites (yards, camp sites) and access roads will affect top soil with the risk of resource loss*	*• Local – PV plant area and underground cables working strip (up to 50 m)* *• Local to regional – depending on disposal site contamination*	• *Construction site management plan Topsoil preservation and reinstatement Minimise compaction; control vehicle movement* • *Reinstatement of topsoil following completion of construction activities in the OHL* • *Oil & Chemical Spill Contingency Plan Training for workers on soil protection*
Water Environment	• *Sediment plumes from runoff at plant site, camps, OHL working strip and access roads* • *Oil & chemical contamination from machinery and fuel storage* • *Wastewater and solid waste generation from camps/work sites*	*• Local – immediate vicinity of work sites (up to 50 m)* *• Could extend downstream up to 1 km depending on local conditions*	• *Erosion and sediment control (silt fences, drainage) Machinery maintenance to prevent leaks Oil/fuel storage in bunded areas Chemical handling procedures Wastewater treatment prior to discharge Locate camps away from watercourses Monitoring of water quality (Environmental Monitoring Plan) Emergency spill kits on site* • *Fuelling / bunkering procedure for*

			machinery, generators, etc. • *Bounded or contained oil/fuel storages* • *Oil & Chemicals Spill Contingency Prevention & Planning* • *Oil & Chemical spill response kit on sites* • *HSE Training of all on-site personnel on environmental awareness (including managing erosion and siltation on site and waste management) and oil & chemical spill prevention and response. This mitigation measure is valid for all impacts.* • *Waste management plan*
Air Quality and Climate Factors	• *Impacts from dust generated from earth works, excavation, vehicles movement, stockpiles, unpaved sur- faces, etc. at the work sites, access roads, yards and camps. Receptors will include residential population, workers, fauna and flora species, cultural, historic, water quality, etc.* • *Impacts from emissions to the atmosphere from machinery and vehicles (i.e. generators, excavators, bulldozers, side booms, trucks, cars, compressors etc.). Receptors will include residential population, workers, fauna and flora species, water qual- ity, etc.*	• *Local, typically in the vicinity of the work sites (within 100 m) and associated facilities (new roads, yards, camps). Specific distances depend on local conditions and could be up to hundreds of meters in certain unfavorable meteorological situations.* • *Local, typically vicinity of the construction sites (within 100 m) and up to hundreds of meters. Specific distances depend on local conditions.* • *Global - Greenhouse gases*	• *Good construction site management practices such as covering of loose materials, vehicle speed limits, watering dusty surfaces in dry weather, sheeting of trucks, etc.* • *Environmental and social management plan* • *Maintenance of equipment and vehicles* • *Routing of construction traffic away from sensitive areas* • *Training of operators and drivers* • *Avoiding construction traffic from crossing densely populated areas or historic centres* • *Traffic management plan* • *Use of low sulphur fuels if available* • *Environmental and social management plan.*
Noise and Vibration	*Impacts from noise and vibration from machinery, construction vehicles, blasting of rocks (if required) and compressors. Noise receptors will include residential population (and sensitive receptors like schools and hospitals), workers, fauna, cultural/historical buildings, etc.*	*Local, specific distances de- pend on local conditions and source. For machinery and construction vehicles typically between work sites (up to 50 m) and up to hundreds of meters.*	• *Good construction site management* • *Limiting working hours close to sensitive receptors* • *Using specific mitigation on noisy equipment (acoustic shielding)* • *Locating noisy equipment away from noise sensitive receptors* • *Speed limits for vehicles*

			• *Adequate Personal Protective Equipment (PPE) for workers* • *Monitoring of main emission sources - Environmental Monitoring Plan* • *Environmental and social management plan.*
Biodiversity and Natural Habitats	• *Impacts from habitat loss – both temporary and long-term/permanent. Temporary impacts will arise from work sites, camps, and yards, which will be reinstated, where possible, to pre-construction conditions once construction is completed.* • *Habitat fragmentation created by linear structures (OHL, access roads)* • *Habitat loss due to vegetation clearance, grading, and site preparation within the PV plant footprint.* • *Habitat fragmentation caused by linear structures (OHL, access roads, fencing).* • *Disturbance of species of conservation concern (e.g., Testudo hermanni, Lissotriton graecus, Podarcis melisellensis, Algyroides nigropunctatus).* • *Potential destruction of microhabitats (stone walls, rocky crevices, karst depressions, small ponds).* • *Direct mortality of slow-moving fauna (tortoises, amphibians) during construction activities.* • *Impacts on protected invertebrates (Hirudo verbana, Aeshna cyanea) due to alteration of small aquatic bodies.* • *Disturbance of nesting or feeding birds (Bubo bubo, Streptopelia turtur) through noise, vibration, and loss of foraging grounds.* • *Disturbance of bat species (Myotis capaccinii, Rhinolophus ferrumequinum) from night lighting and increased human activity.* • *Pollution risks (waste disposal, accidental oil or chemical spills) affecting habitats and fauna.* • *Disturbance or direct impacts to flora and fauna species of conservation interest due to project activities (noise, aqueous discharges, sediment plumes, greater human presence in previously*	• *PV plant area* • *Local working strip (up to 50 m) and footprint of associated facilities (roads, camps, yards)* • *Specific distances depend on local conditions and could extend to hundreds of meters for terrestrial impacts*	• *Minimise project footprint by careful micrositing of panels, access roads, and OHL to avoid sensitive habitats.* • *Conduct pre-construction biodiversity surveys; relocate tortoises, amphibians, and other vulnerable species before site clearance.* • *Avoid construction activities during the active season of Testudo hermanni (March–October), especially in areas with confirmed presence.* • *Preserve and restore stone walls, rocky microhabitats, and karst ponds where possible.* • *Limit construction activities during critical breeding and nesting periods for birds, reptiles, and amphibians* • *Install wildlife-friendly fencing (20 cm clearance from ground) to allow passage of small animals.* • *Manage lighting with downward-facing, sensor-controlled lamps to reduce impacts on bats and nocturnal fauna.* • *Re-vegetate temporary construction areas with native species after works.* • *Train workforce in biodiversity awareness and species protection procedures.* • *Implement Environmental and Social Management Plan (ESMP) and specific monitoring programme for flora and fauna during construction and operation.*

	inaccessible areas). Particular risk to sensitive areas such as nesting sites, foraging grounds, or habitats of endemic and protected species. • *Site preparation activities (clearing, grading, levelling) leading to direct and indirect disturbance of vegetation and permanent loss of habitat.* • *Modification of natural regime through removal of vegetation cover, alteration of hydrological conditions of water bodies, concreting, increased noise and vibration. Impacts on mammals mainly stem from direct loss of habitats in intervention zones.* • *Transformation of land and temporary disturbance from access road construction, worker facilities, machinery storage, etc.* • *Pollution pressures (solid waste disposal, landfills, chemical or air pollution) affecting habitats and species.*		
Landscape and Visual Amenity	• *Homogenization of landscape elements* • *Visual intrusion and change in landscape character*	• *Local – impacts that affect local environmental, socioeconomic or cultural heritage resources or are restricted to a single habitat/biotope, a single (local) ad- ministrative area or a single community.* • *Although considered local, the geographical extent of each im- pact within this category can be variable, depending on the im- pact type and location. Local impacts may be restricted to the work sites and areas directly affected by associated facilities (e.g. access roads, workers camps and cable line), how- ever there will be local impacts that extend beyond but are still within the local context (e.g. within hundreds*	• *Design solar plant layout to follow terrain topography* • *Minimise earthworks and alterations to terrain* • *Panels positioned compactly to reduce fragmentation* *Landscaping and visual screening where possible* *ESMP implementation*

		of meters or kilometric distances from the source of impact).	

Table 6-2: Potential Socioeconomic Impacts and Mitigation Measures related to Project Construction and Pre-commissioning

Impact Area	Potential Impact / Source	Area of Influence	Potential Preventive / Mitigation Measures
Displacement of Existing Land Uses, Property and People	• *Impacts on land uses will arise as a result of land take for the PV plant and other permanent installations. Land for camps and yards will be re- instated, where possible, following the completion of the construction activities returning the land to its original use.* • *Land take for PV plant and associated infrastructure (approx. 70 ha).* • *Impacts on agricultural plots (potatoes, onions, grazing)* • *Several properties already abandoned or seasonally used in KO Rudine.*	• *Local: Owners and users of land within PV plant site and RoW of OHL, KO Rudine (18 inhabitants, 10 households, 28 dwellings).*	• *Ensure fair and transparent compensation in line with national legislation and EBRD PR5.* • *Restore temporary land uses (camps, yards) after construction.* • *Maintain access to agricultural and grazing areas where possible.* • *Ongoing stakeholder engagement and grievance redress mechanism.*
Socio-Economic Impacts on Livelihoods and Economy	• *Impacts to local livelihoods and loss of household income as a result of construction works (e.g. temporary and long term occupation of agricultural land or reduced access)* • *While there might be a temporary pressure on these infrastructures in the short term, there may be also a positive impact on infrastructure development in the medium to long term, if the project helps develop existing infrastructures.* • *The presence of workers on the site and the money they earn and spend may cause changes to local customs and norms and result in local inflation* • *Economic benefits to households and to the local economy as a result of direct/indirect job creation during construction works.* • *Benefit to the local community and economy as a result of local procurement of materials for construction and other services to supply the project.*	• *Local: Owners and users of land within the construction corridor for the transmission lines and associated facilities (new roads, yards, camps) and areas occupied by permanent installations.* • *Local: Land owners and users of land plots and areas affected by decreased accessibility due to the presence of construction sites.* • *Local and regional (communities and region): Individuals will benefit from employment and procurement opportunities.* • *National: Employment and procurement opportunities for construction specialists and providers of goods and services*	• *Ensure compensation accounts for livelihood restoration.* • *Maximise local employment during construction, with fair recruitment process.* • *Procure goods and services from local suppliers where feasible.* • *Engage a Community Liaison Officer (CLO) to monitor socio-economic impacts.*
Impact on Local Infrastructure and	• *Temporary pressure on local roads due to workforce presence.*	• *Local: KO Rudine households.* • *Regional: access roads*	• *Camps to be self-sufficient (water, wastewater, energy).*

Services	• *Increased traffic during construction.* • *Limited risk since KO Rudine lacks public infrastructure (no schools, health centres).*	*connecting Rudine to Nikšić.*	• *Road maintenance agreements with municipality.* • *Traffic management plan and safety training.* • *Worker camps to be located away from households.*
Community Health, Safety and Wellbeing	• *Risks due to traffic and heavy machinery.* • *Noise, dust, and vibration impacts, particularly for 2 household clusters (25 m and 180 m from site).* • *Potential risks from workforce-community interaction.* • *Safety risks for communities along roads used by project traffic.* • *Potential health risks from EMF and OHL if any.* • *Potential nuisance due to Corona effect from OHL if any.* • *Increased risk of communicable diseases and gender-based violence linked to workforce presence.*	• *Local: Communities currently using and living along the roads to be transited by the project's vehicles.* • *Local and regional: Communities along transportation routes* • *Local: KO Rudine and KO Vilusi households and nearby hamlets.* *Regional: communities along transport routes.*	• *Traffic safety awareness programs in local schools and communities.* • *Respect national and international safety distances.* • *Strict worker management policies to prevent GBV and communicable diseases.* • *Develop Worker Accommodation Plan in line with EBRD/IFC guidelines.* • *Avoid locating worker camps close to communities. In case of the need, local camps should be done according to Working Accommodation Guideline (EBRD and IFC standards; 2009)* • *Worker Codes of Conduct will be developed with appropriate disciplinary procedures for breaches.*
Community Infrastructure and Cultural Norms	• *Temporary pressure on social infrastructure (roads, water) due to construction workforce.* • *Possible changes in local customs due to workforce presence.* • *Risk of local inflation from increased spending power of workforce.*	• *Local and regional: communities near construction sites and workforce camps.*	• *Provide recreational and health facilities at camps or through agreements with local services.* • *Identify infrastructure upgrades (e.g. roads) that benefit communities.* • *Engage CLO to manage community relations.* • *Develop and enforce Workers' Code of Conduct with disciplinary measures.*
Working Conditions	• *Risks of injuries during excavation, heavy machinery use, and roadworks.* • *Risk of electrocution.* • *Accidents and emergency situations.*	• *Local: Construction sites and associated facilities.*	• *Provide PPE and training* • *Develop HSE management system in line with international standards.* • *Emergency Response Plans and drills.* • *Fence/mark hazardous areas (e.g. trenches).* • *Good site management practice (training and qualification of staff, appropriate work standards) will be implemented to reduce health and safety risks. Fencing or*

			marking where there are open ditches etc. to stop people or animals from accidents.
Supply Chain Management	*• Risks of forced/child labour, discrimination, poor working conditions, unfair recruitment, GBV in supply chain.*	*• Local: workers employed along contractor and subcontractor supply chains.*	• *Exercise control over supply chain contracts.* • *Establish Grievance Redress Mechanism (GRM) for workers.* • *Regular monitoring of contractors and subcontractors for compliance with labour standards.*

Table 6-3: Potential Impacts and Mitigation Measures – Cultural Heritage

Impact Area	Potential Impact / Source	Area of Influence	Potential Preventive / Mitigation Measures
Cultural heritage (known and potential) including "intangible cultural heritage" (ICH)	*Ground-disturbing construction activities including excavation, earthworks, trenching and land take for PV plant, OHL, access roads, camps and other associated facilities.* *Risk of damage to archaeological remains and cultural monuments during construction.* *Potential disturbance to local intangible cultural heritage practices (traditional land use, gathering of medicinal plants, seasonal livestock grazing, etc.).*	*Local: work sites, PV plant footprint, OHL corridor (50 m), access roads, camps, substations, landfills.* *Regional: communities potentially affected by reduced access to traditional landscapes and cultural practices.*	• *Preparation and implementation of a Cultural Heritage Management Plan (CHMP) in line with EBRD PR8 and national legislation.* • *Detailed reconnaissance survey and mapping of known monuments, ICH, and archaeological sites before works begin.* • *Implementation of archaeological monitoring and a Chance Finds Procedure, with special attention to areas identified as high archaeological potential.* • *Avoidance of known or likely impacts by design modification and micro-siting of facilities.* • *Removal and documentation of resources through rescue excavations and associated studies, if avoidance is not possible.* • *Ongoing stakeholder engagement with local communities and cultural institutions to identify and safeguard intangible cultural heritage practices.* • *Integration of CHMP measures into the project Environmental and Social Management Plan (ESMP).*

6.3. Operation, Maintenance and Decommissioning

Table 6-4: Potential Environmental Impacts and Mitigation Measures Related to Project Operation, Maintenance and Decommissioning

Impact Area	Potential Impact / Source	Area of Influence	Potential Preventive / Mitigation Measures
Resources and Waste	• Waste generated by the project during operation and maintenance (e.g. packaging, worn-out equipment, oil residues, office waste).	• Local: depending on specific conditions and needs of the operational and maintenance process.	• Develop and implement a Waste Management Plan for the operational phase. • Segregation, recycling, and safe disposal of waste streams. • Regular staff training on waste handling procedures.
Noise and Vibration	• Noise emissions from inverters, transformers, and occasional maintenance works. • Noise and vibration receptors will be affected in the immediate vicinity of facilities and along the OHL.	• Local: within the PV plant and in the vicinity of facilities and OHL (less than 50 m from both sides).	• Regular monitoring of emission sources as part of the Environmental Monitoring Plan. • Placement of noise-generating equipment away from sensitive receptors. • Limit noisy maintenance activities to daytime hours.
Biodiversity and Nature Conservation	• Impacts to flora and fauna from routine vegetation clearance within PV plant and OHL RoW. • Potential impacts to birds due to collision with OHL or changes in flight patterns. • Disturbance to fauna during decommissioning phase. • Spread of invasive/allochthonous plant species during operation or decommissioning.	Local: relevant to the PV plant and OHL RoW regarding vegetation clearance. Regional or broader: impacts to migratory birds.	• Restore pre-construction conditions where possible (e.g. re-vegetation of temporarily affected sites). • Implement bird-friendly measures (e.g. bird diverters, line marking to increase visibility). • Regular monitoring of flora and fauna at sensitive locations. • Integrate measures into the Environmental and Social Management Plan (ESMP). • Control and prevent spread of invasive plant species.
Landscape and Visual Impacts	• Visual changes due to permanent presence of PV panels, OHL towers, and substations. • Long-term impacts from maintaining low vegetation in corridors. Temporary visual impacts during decommissioning (equipment removal, land disturbance).	• Local, but visible from larger distances depending on topography and local conditions.	• Follow natural terrain contours when siting PV fields and OHL towers. • Restore pre-construction conditions as much as possible (e.g. re-vegetation after decommissioning). • Use of natural screening (tree planting, visual buffers) where feasible.

Table 6-5: Potential Socioeconomic, Health and Safety Impacts and Mitigation Measures – Operation & Decommissioning

Impact Area	Potential Impact / Source	Area of Influence	Potential Preventive / Mitigation Measures
Displacement of Existing Land Uses, Property and People	• *Permanent land acquisition/easement during operation.* • *Permanent changes to land use, in particular agricultural land for permanent crop production (e.g. tall trees).*	• *Local: Owners and users of land occupied by project installations.*	• *The ESMP will address operational and decommissioning impacts on land.* • *Compensation to landowners/users in line with national legislation and EBRD PR 5.* • *Ongoing stakeholder engagement with affected communities in line with EBRD PR 10.*
Socioeconomic Impacts	• *Contribution to sustainable economic development of Montenegro and the region.* • *Global contribution to climate protection through CO_2 reduction.* • *Benefits in service provision (i.e. improved quality of power supply).*	• *National, regional and local.*	• *No mitigation required (positive impacts).* • *Ensure transparent communication of benefits to communities.*
Community Health and Safety	• *Risk of electrocution for people trespassing the PV plant or climbing OHL towers.* • *Potential accidents during decommissioning works (heavy machinery, dismantling of structures).*	• *Local: Communities in the project area, especially those living or working near PV and OHL.*	• *Stakeholder engagement and safety awareness campaigns.* • *Installation of appropriate signage illustrating dangers of trespassing/climbing.* • *Secure fencing around all installations.* • *Regular inspections of PV and OHL infrastructure.* • *Emergency response plan covering community safety incidents.*
Non-ionizing Radiation	*Electromagnetic Fields (EMF) from OHL.*	• *Local: Communities along the OHL route and farmers working beneath the lines.*	• *Appropriate tower design and line configuration to minimize EMF.* • *Respect international and national EMF exposure standards.* • *Locate lines away from sensitive receptors where possible.* • *Restrict agricultural or other activities directly under the OHL where necessary.*
Working Conditions	*Risks of injury for workforce during routine operation and maintenance (electrocution, working at heights, heavy lifting, exposure to weather conditions).*	• *Local: Workforce engaged in operation and maintenance.*	• *Develop and implement an HSE Management System in line with international standards.*

			• *Comprehensive training and qualification of staff.* • *Use of Personal Protective Equipment (PPE).* • *Good site management practices.* • *Emergency Response Plans and drills for operation and decommissioning phases.*

Table 6-6: Potential Cultural Heritage Impacts and Mitigation Measures – Operation & Decommissioning

Impact Area	Potential Impact / Source	Area of Influence	Potential Preventive / Mitigation Measures
Cultural heritage (known and potential), including Intangible Cultural Heritage (ICH)	*No specific impacts or risks are expected during the operation phase (land take and earth works limited to construction phase).* *Ground disturbing removal and restoration activities during decommissioning.*	*• Local: within construction areas and the footprint of associated decommissioning activities.*	• *Cultural Heritage Management Plan (CHMP) including tangible and intangible cultural heritage.* • *Implementation of archaeological monitoring and "chance finds" procedure during decommissioning.* • *Engagement with national cultural heritage authorities to ensure compliance.* • *Restoration of land following decommissioning to avoid long-term cultural impacts.*

6.4. Main Findings of Preliminary Assessment

The preliminary impact assessment presented in the tables above has been developed on the basis of the currently available project documentation, the baseline environmental and socioeconomic information collected to date, as well as the experience gained from similar PV projects in Montenegro and the wider region.

The likelihood, magnitude, and significance of the identified impacts will be further assessed in detail within the full ESIA study. However, the preliminary assessment indicates that most construction-phase impacts of the SE Rudine project and its associated components are temporary in nature and largely localised. These typically include short-term noise and dust emissions from construction machinery and vehicle movements, impacts on land use and soil resources, disturbance or loss of habitats and species (including protected and endemic flora and fauna recorded in the baseline), visual and landscape impacts, as well as the permanent loss of a portion of agricultural and pasture land. On the positive side, the project is expected to generate local employment and provide socioeconomic benefits to the municipality of Nikšić, where such opportunities are of particular importance.

In addition to the solar power plant itself, the project also includes the reconstruction of approximately 10 km of the existing 110 kV Nikšić–Bileća transmission line, as well as the construction of two new 500 m OHL sections that will connect the PV plant to this line and to the Vilusi substation. Since the reconstruction will be carried out within the existing transmission corridor and the new sections are relatively short, no major new environmental or social impacts are expected. Nevertheless, construction activities along the line may temporarily affect soil, vegetation, and local fauna, and will require the application of good construction practices and targeted mitigation measures, particularly regarding dust suppression, bird protection, and timing of works to avoid sensitive periods for protected species.

During the operational phase, the environmental and socioeconomic impacts of the PV plant are expected to remain very limited. The use of existing grid infrastructure and the reconstruction of the existing OHL, rather than building entirely new corridors, will help to minimise long-term impacts on land use, landscape, and biodiversity.

7. Terms of Reference for ESIA

7.1. Introduction

A key outcome of the scoping process is the definition of the Terms of Reference (or ToR) of the detailed ESIA study. The findings of the ESIA study will be presented in the ESIA report which will be prepared in compliance with Serbian National laws and regulations as well as EBRD Performance Requirements.

The following sections present the Terms of Reference of the detailed ESIA. The section is structured as follows:

Overview of activities to complete the ESIA process;
Specialist studies;
Stakeholder engagement;
Outline structure for the final ESIA report; and
Provisional schedule for the ESIA process.

7.2. ESIA Objectives

The purpose of the ESIA is to assess the potential impacts of the project and project-related activities on the environment (including biophysical, socio-economic and cultural heritage resources) and, where applicable, to design mitigation or enhancement measures to avoid, remove or reduce negative impacts (or enhance positive impacts) to the environment.

7.3. ESIA Steps

Following on from the scoping phase of the project, the ESIA will:

- *Update and finalise the technical project description as further engineering details become available, working closely with project engineers to confirm details such as the final layout of the PV plant and the other project components, final location and layout of temporary infrastructures (pipe yards and worker camps), and location of transmission lines towers;*
- *Conduct stakeholder consultation and further refine the scope of the ESIA as necessary;*
- *Collect additional baseline data through desktop research and field studies to complete a comprehensive description of the environmental, social and cultural heritage conditions;*
- *Assess the impacts associated to project construction, operation, maintenance and decommissioning to the environment and society;*
- *Develop mitigation and enhancement measures and elaborate an Environmental and Social Management Plan (ESMP) including an approach for monitoring;*
- *Report findings in a comprehensive ESIA report.*

7.4. Specialist Studies

To develop a better understanding of the existing environmental, social and cultural heritage conditions (resources and receptors) in the project zones of influence, further desktop, literature and field studies will be carried out.

7.4.1. Desktop Studies

Desktop studies will include additional research to identify existing documentation that contains information relevant to key resources present in the project environment. Potential sources include publicly available literature with relevance to the project site and general area.

Finally, project engineering studies will be reviewed for quantitative information on environmental elements. Studies that may provide useful data could be geological / technical investigations, process and operations water source investigations, surface drainage studies, soil classification studies, air emission studies and any other studies of relevance.

7.4.2. Field Studies

Where desktop information is not adequate or reliable, primary data will be collected by field studies

carried out by environmental, socio-economic and cultural heritage specialists. Local specialists with qualifications in the particular resource area and knowledgeable of the local conditions will be assigned. In addition, requests will be made to relevant ministries, government agencies and research institutions for the provision of information. International specialists will be responsible to provide technical guidance and quality assurance.

The following field surveys are currently planned:

- *Ecological survey of the proposed PV Plant, substation location and transmission line corridor, focusing on flora and fauna elements of ecological interest (likely sensitive species and habitats);*
- *Culture Heritage survey of the areas affected by Project activities; a walk-through survey of the locations will be carried out. In case the locations give rise to further suspicion for the presence of underground cultural structures, auger drillings will be performed to provide certainty.*
- *Socioeconomic surveys at the communities neighbouring the project area in order to complement existing national census information;*
- *Targeted socioeconomic surveys (i.e. focus group discussions) of likely vulnerable population groups affected by the project.*

Seasonal restrictions will be taken into account in undertaking field surveys, considering also the project time schedule. Survey methodologies will be developed and shared with the ESIA.

7.5. Land Acquisition and Resettlement Planning

The project will require permanent land take for the PV plant footprint and permanent easements for the new 500 m connection line, as well as for the reconstruction of the existing 110 kV transmission line (approx. 10 km). At this stage, only the conceptual design is available and no expropriation studies or detailed engineering designs have been prepared yet.

In line with EBRD PR 5 and national legislation, a Land Acquisition and Resettlement Framework (LARF) will be developed during the ESIA stage. The LARF will define the principles, eligibility criteria, entitlements, compensation mechanisms, institutional arrangements, grievance redress procedures, and consultation requirements applicable to any future land acquisition or easement establishment.

Once the Main Design and expropriation elaborates are available, a Land Acquisition and Resettlement Plan (LARP) will be prepared to operationalise the framework, including detailed household-level data, compensation agreements, and implementation schedules.

7.6. Environmental Quality Measurements

Measurements of air quality and noise will be carried out at the nearest settlements to the project sites, in order to establish the baseline with regard to atmospheric quality and noise.

7.7. Stakeholder Engagement

Upon completion of scoping consultation and disclosure, the subsequent steps will be undertaken:

- *ESIA phase consultation;*
- *ESIA report disclosure.*

7.7.1. ESIA Phase Consultation

Engagement activities carried out at ESIA stage include consultations designed to inform local stake-holders about project design, to obtain their key concerns and high level issues and to inform the development of mitigation for the project. This consultation will enable the ESIA team to refine the ESIA analysis by generating additional feedback on the ESIA approach, key issues and analysis of potential impacts (such as assessment of their relative significance).

7.7.2. ESIA Report Disclosure

In line with the requirements of national legislation, a public hearing on the Draft Environmental Impact Assessment (EIA) for the SE Rudine project was organised by the Environmental Protection Agency of Montenegro. The public hearing took place in the premises of the Municipality of Nikšić (Njegoševa 18), on **20 November 2024 at 10:00h**.

The event was publicly announced through the Official Gazette of Montenegro and the website of the Agency. The hearing was open to all interested stakeholders, and comments and suggestions provided during the session were considered in the finalisation of the EIA Report.

Following the public hearing and revision of the documentation, the **Environmental Protection Agency granted its approval of the EIA on 19 December 2024**.

Following the ESIA report disclosure, public hearings will be organised in line with EBRD PR 10 - dates and locations will be identified and disclosed in advance. The notification of the public hearings will be announced through media and the hearings will be open to the public.

Comments and suggestions made at the public hearings will be considered during finalisation of the ESIA report.

7.8. Structure of the ESIA Report

An outline of the proposed contents of the ESIA report is provided in Table 7-1. The content may alter during the evolution of the project or based on the findings of consultation, however it is anticipated that the contents of the ESIA report will accord broadly with the following.

Table 7-1 Tentative ESIA Report Structure

Chapter No.	Contents Heading	Description
		Title page, acknowledgements, authors and contributors, table of contents (including lists of figures, tables, and maps)
Non-technical Summary		*Summary of the entire ESIA report.*
1	*Introduction*	*This Chapter will outline the development and structure of the ESIA report including the background, scope, terms of reference and declaration.*

2	*Project Justification*	*This Chapter will include discussion of the Project back- ground, objectives, need for the project, value of the project, envisioned sustainability, alternatives considered (including no project alternative), development options considered and site selection.*
3	*Legislative and Policy Framework*	*This Chapter will outline the policy, legal and institutional framework within which the ESIA has been conducted. National regulations will be summarised along with relevant international agreements and conventions to which Serbia is party, as well as applicable international best practice guidelines and project standards.*
4	*Project Description*	*This Chapter will provide a concise description of the project and its geographical and temporal context. It will include a site description, an overview of the Project design and details of project inputs and outputs.*
4	*Description of the Environment*	*This Chapter will summarise the available baseline data on the environmental and social resources and receptors within the Project Study Area. It will be based on both primary and secondary data sources and will consider changes in the baseline condition without the development in place.*
5	*Consultations and Disclosure*	*This Chapter will present the results of consultation under- taken as part of the ESIA, plus plans for future consultation. It will identify key project stakeholders and present their feedback on the Project.*
6	*Associated and Potential Impacts*	*This Chapter will summarise the predicted positive and negative impacts of the Project. Cumulative impacts will be assessed as appropriate.*
7	*Mitigation and Residual Impacts*	*This Chapter will outline general and specific mitigation measures to reduce, remove or avoid negative impacts to environmental and social receptors. Any residual impacts (post mitigation) will be outlined.*
8	*Environmental and Social Management Plan (ESMP)*	*The ESMP will draw together the possible mitigation measures; group them logically into components with common themes; define the specific actions required and time- table for implementation; identify training needs, institutional roles and responsibilities for implementation; and estimate the costs of the measures.*
9	*Conclusion*	*This Chapter will summarise conclusions that are made based on the assessment as well as outline any further recommendations.*
Bibliography and References		*All references made in the report and documents drawn upon during the course of the assessment*
Annexes		*These will include technical annexes with details of specific technical surveys, the bibliography and list of acronyms.*

7.9. Scoping and ESIA Schedule

A provisional schedule for the ESIA is provided in Table 7-2 below.

Table 7-2 ESIA and Stakeholder Consultation Schedule

	Period
Submission of Scoping Report	**October 2025**
Review and approval (Client / EBRD)	**Upon submission of the scoping report**
Scoping Disclosure	**November 2025**
ESIA Specialist Field Surveys	**October-December 2025**
Submission of Draft ESIA	**November-December 2025**
ESIA Phase Consultation	**March 2025**

7.10. Stakeholder Engagement

7.10.1. Scope

Stakeholder engagement within the scope of the project is based on national/Serbian requirements and best international practice, including EBRD Performance Requirements – especially PR 10.

Qair Montenegro doo, intends to undertake a process of stakeholder engagement throughout the project planning, construction, operation and decommissioning phases. The plan for this engagement, including identification of stakeholders (i.e. people and organisations who have a role in the project or could be affected by the project activities or who are interested in the project) and disclosure of information, consultation, and handling of suggestions, comments and concerns, is documented in the Stakeholder Engagement Plan (SEP), which accompanies this Scoping Report. This plan will be a living document and will be updated as required.

The project has already engaged with the local communities in the project area, as well as with other national and regional organisations, during project planning. Details are provided in the following.

The stakeholder engagement which is planned for the scoping phase aims at providing specific information on the project, commensurate to the current level of technical knowledge, and an opportunity for stakeholders to provide feedback on the scope, approach and key issues that will be addressed during the ESIA study phase as well as the plans for future engagement activities. The main emphasis of the scoping phase engagement is to present the project to government agencies, NGOs and other key groups as well as to community

leaders.

7.10.2. Pre-Scoping Consultation

During the initial planning stages of the SE Rudine project, stakeholder engagement activities primarily focused on land negotiations, early dialogue with local residents in Rudine, and information-sharing related to the future development of the solar power plant. The purpose of these activities was to build trust with landowners and neighbouring households, verify local community expectations, and identify any early concerns well before the ESIA process formally began.

Engagement efforts included negotiations to secure land lease and easement agreements, as well as introductory meetings with community members and local administrative representatives. These discussions also served to inform the preparation of the future Social Investment Plan. The summary of early engagement activities is provided below.

Table 7-3 Summary of Pre-Scoping Consultation

Date	Stakeholder(s)	Description
15 December 2022	*Private Landowner – Spasoje Bulajić*	*Initial negotiations regarding land for the solar power plant. Landowner confirmed willingness to cooperate and support continued project development.*
24 May 2023	*Private Landowner – Spasoje Bulajić*	**Lease Agreement signed.** *Landowner granted full access and committed to supporting project activities and communication with other residents.*
10 June 2023	*Local residents (Krivokapić, Perović households)*	*Meeting held after issuance of Urban-Technical Conditions. Residents expressed* **full support**, *confirmed* **no objections**, *and welcomed potential local benefits (improved access, economic opportunities).*
2024	*Affected persons in Rudine*	*Household-level consultations conducted during preparation of the EIA.* **No complaints were received.**
20 November 2024	*General public, PAPs, local stakeholders*	**Public Hearing on the EIA**, *organized by the Environmental Protection Agency at Nikšić Municipality Hall (Njegoševa 18). Project impacts and mitigation measures were presented and discussed. No objections were recorded.*
19 December 2024	*EPA and Project Proponent*	**EIA Approval issued** *by the Environmental Protection Agency following disclosure and consultations.*

7.10.3. Scoping Consultation

Following the approval of the ESIA Scoping Report from the Client, the Scoping Report will be disclosed to stakeholders:

- *The Scoping Report will be uploaded to the web site of the Client;*
- *Hard copies of the Scoping Report will be sent to the Urban Planning Dept. of the City of Niksic as well as the Local Municipal offices of Vilusi and Rudine;*
- *Open hearings/public presentations will be organised at the communities of Vilusi and Rudine.*

The results of the Scoping Consultation and the likely concerns of stakeholders will be addressed in the ESIA.