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* This designation is without prejudice to positions on status and is in line with UNSCR 1244/199 and the ICJ opinion on the Kosovo declaration of independence.

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WB21-MKD-ENE-03

North Macedonia, Strengthening the Transmission Network in the Southeast Region of North Macedonia - Component 1

Sub-project 1 - New 400/110 kV Substation Miletkovo with Connection to the existing 400 kV and 110 kV Transmission Network

Environmental and Social Assessment

Non-Technical Summary

September 2022

HILL INTERNATIONAL
IPF 7 CONSORTIUM

The Western Balkans Investment Framework (WBIF) is a financing facility launched in December 2009 by the European Commission, together with the Council of Europe Development Bank (CEB), the European Bank for Reconstruction and Development (EBRD), the European Investment Bank (EIB), Bilateral Donors, and Western Balkans countries with the purpose to deliver funding for strategic investment projects in beneficiary countries. Eligible sectors include infrastructure development in the environment, energy, transport, social and digital sectors as well as private sector development. KfW and the World Bank subsequently joined the Framework. In July 2017, the KfW became a partner organisation.

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Abbreviations

Abbreviation	Meaning
CESMP	Construction Environmental and Social Management Plan
E&S	Environmental and Social
EBRD	European Bank for Reconstruction and Development
EIB	European Investment Bank
EIA	Environmental Impact Assessment
ESP	Environmental and Social Policy (of the European Bank for Reconstruction and Development)
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESMS	Environmental and Social Management System
EU	European Union
EVP	Electric Traction Plant (in Macedonian '*Електровлечно построение*')
FS	Feasibility Study
GIP	Good International Practice
IFI	International Financing Institution
IMS	Integrated Management System
IPF7	Infrastructure Project Facility, Technical Assistance 7
MEPSO	Transmission System Operator of North Macedonia
OG	Official Gazette
OHL	Overhead Line
OHS	Occupational Health and Safety
RES	Renewable Energy Sources
RoW	Right of Way
SEP	Stakeholder Engagement Plan
SS	Substation
TSO	Transmission System Operator
WB	Western Balkans
WBIF	Western Balkans Investment framework

1. Introduction

The main objective of this project is to design, construct and operate a new 400/110 kV substation (SS) Miletkovo in the area of the village Miletkovo, in Gevgelija municipality, and connection of this new substation with the existing 110 kV transmission network in the region and with the existing 400 kV transmission line Dubrovo – Thessalonica (GR), by in-out connection ('Project').

The Project is a component of a wider development scheme for strengthening the transmission network in the Southeast Region of North Macedonia, which also includes a project for reconstruction of the existing 110 kV transmission line from Valandovo to Strumica.

The project developer is the Macedonian Transmission System Operator (MEPSO). MEPSO is a Joint Stock company fully state-owned, established in 2005 after the transformation of the Electric Power Company of Macedonia ('Elektro-stopanstvo na Makedonija'). The core activity of MEPSO is a reliable electricity transmission via the national high voltage network, electric power system control and regular and duly electricity flow to its clients such as the large industrial consumers, and to the low voltage grid of the Macedonian electricity distribution system operator (EVN Macedonia).

MEPSO is seeking financing from the European Bank for Reconstruction and Development (EBRD). Therefore, an Environmental and Social Assessment has been undertaken to meet the EBRD's requirements.

2. Need for the Proposed Project

In order to meet the goals of the European Union for the integration of energy from Renewable Energy Sources (RES), Macedonia makes efforts to maximize the integration of these energy sources into the national power system. Due to the favourable climate conditions, the investments in the RES (wind power, solar power and hydropower) are most cost-effective in the south-eastern region of Macedonia. Therefore, it is expected that the most significant investments in utilization of RES are/will be located mostly in this region (Figure below). Transmission grid in this region of Macedonia is approaching the end of the lifecycle and lacks capacity for connection of new renewable electricity sources to the network. As such, it needs reconstruction due to ageing process. In addition, the Project will provide higher security of supply.

In this stage, the Project is developed to a feasibility level - to a detail considered sufficient to establish that the proposed developments are technically feasible and to allow initial assessment of their environmental and social integrity and effects, i.e. to a level of Technical Assessment (Conceptual Solution) that corresponds to a Feasibility Study. Therefore, the level of detail of the present E&S assessment is compliant with that of the Project's Conceptual Solution whose content and scope are not specifically regulated by the relevant Macedonian legislation[1]. As such, the Conceptual Solution is not considered as formalised design document and no administrative consenting process for its adoption by the competent authorities is required.

Further design, including precise location of towers (for new transmission lines) and new access roads (where necessary) will be undertaken once the more detailed technical design (Preliminary Design and Detailed Design) as required by the Macedonian relevant legislation are developed and prior to construction commencing.

[1] Law on Construction (Official Gazette of RM no. 130/09 and its amendments) and associated by-laws

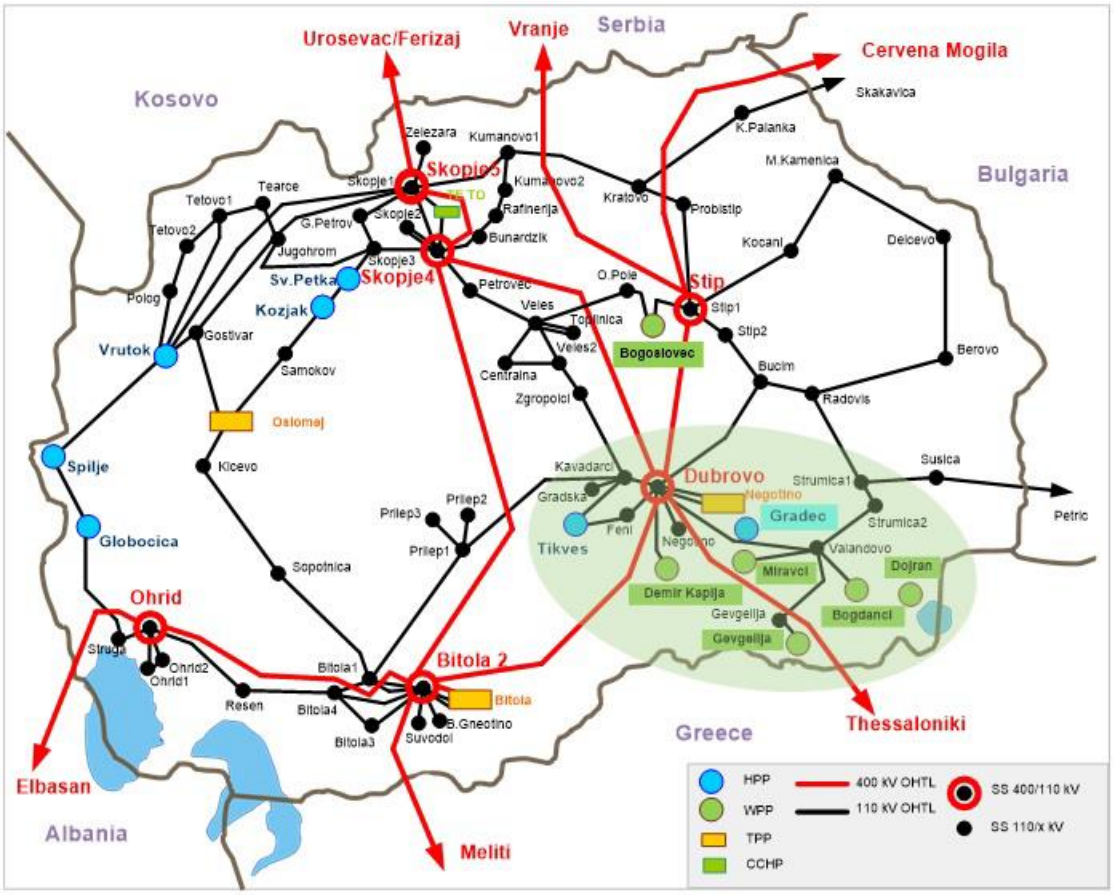

Figure 2.1: Macedonian grid and project area mid-term topology

Source: MEPSO

3. The Proposed Project

3.1 Project Location

The Project area is situated in Southeast Region of North Macedonia, in two Macedonian municipalities - Gevgelija and Valandovo.

The location of the 400/110 kV SS Miletkovo is situated at relative distance of approx. 1 km from the settlement Miletkovo, Gevgelija municipalty, in immediate proximity to the A1 highway Skopje – Gevgelija (Figure below). There are no other existing structures or infrastructure in proximity to this location and no future development plans are associated to the location.

The new substation would be connected to the existing 110 kV grid the following interventions:

- Reconstruction of the existing 110 kV OHL from Valandovo to the existing SS 'EVP'[2] Miletkovo utilizing the same route of the existing line (approx. 6 km) and its approx. 1.9 km long extension to the new SS Miletkovo. The line passes through mainly agricultural land, as well as some shrubland and pastures. The alignment crosses the canalised river Anska Reka at two crossing points as well as the Vardar River.
- Construction of a new approx. 1.8 km long 2x110 kV OHL from the new SS Miletkovo to the existing SS 'EVP' Miletkovo.

[2] EVP – Electric Traction Plant (in Macedonian '*Електровлечно построение*'). It is an electrical substation that converts the power to an appropriate voltage, current type and frequency to supply railway system(s) with traction current.

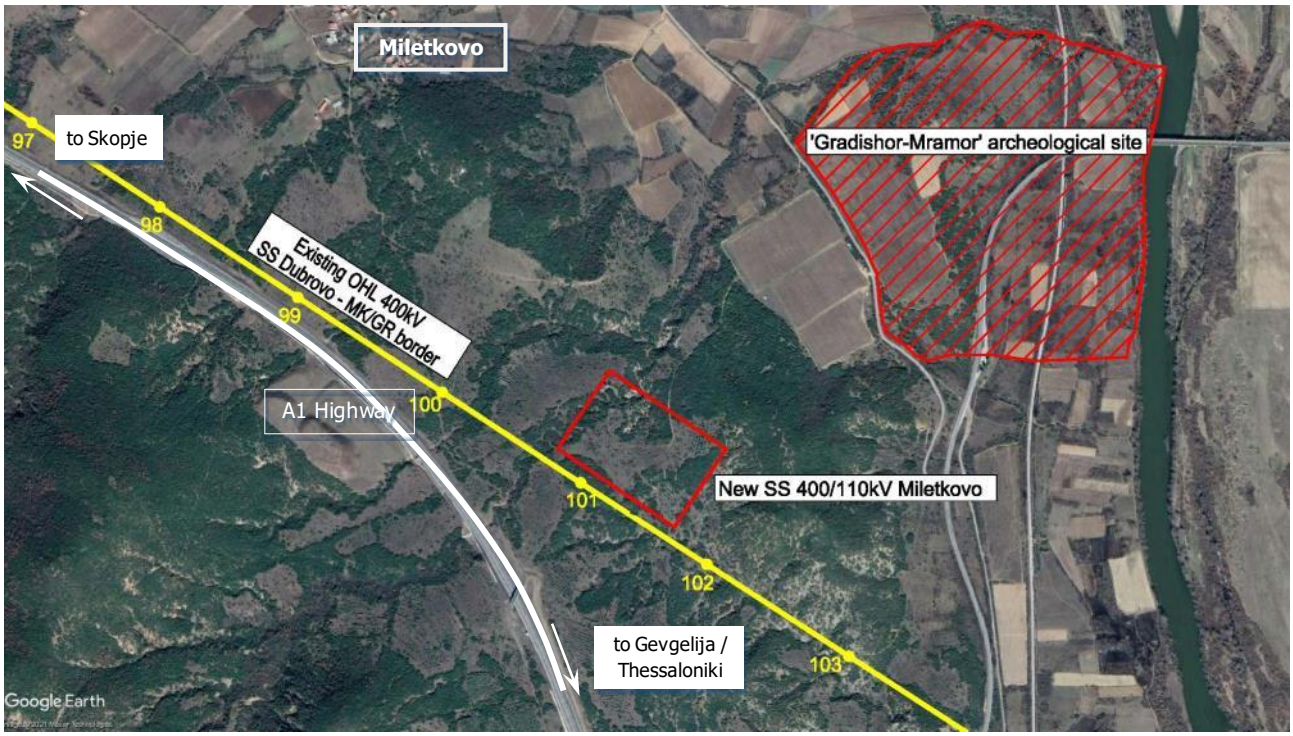

Figure 3.1: Location of the new 400/110 kV substation Miletkovo

Note: The archaeological site depicted in the Figure is at approximate distance of 700 metres from the prposed location of the new substation

The wider Project region - area between Gevgelija, Valandovo and Demir Kapija - is well defined geographical unit that is encircled by mountains from west and east, opened to the south by the river Vardar valley at altitudes. Gevgelija-Valandovo valley is about 60 km away from the Thessalonica gulf. Thus, the Mediterranean influence is evident being one of the warmest regions in Macedonia characterised with warm summers and mild winters.

The Project is located on flat terrain, characterized by the alluvial sediments (clay, sand and gravel) of the Vardar River with estimated depth of several tens of metres. No occurrence of slips and landslides has been registered in the Project area.

The land cover within the Project area is dominated by agricultural land and significant portion is also occupied by vegetation of pseudomaquis. The line alignment crosses the Vardar River as well as the channelled river Anska Reka. The Project does not interact with any legally protected or internationally recognized area.

The study area is predominantly rural in nature, passing through not densely populated zones. The closest settlement is Miletkovo, at approx. 1 km from the substation site. There are no residential or other properties that will be directly affected from the Project. All nearby dwellings and other objects are at a reasonable distance of at least 150 m from the Project elements. The Project crosses several features of transport infrastructure in the Project region: two regional roads, as well as the railway Skopje – Thessalonica (GR).

The cultural heritage site Gradishor – Mramor ('Gradishor-Marble'), in Gevgelija municipality is located approx. 200 metres from the Project. Hence, no direct interaction between the Project and this site is expected.

3.2 Project Elements

The main elements of the Project and their inclusion in the environmental and social appraisal comprise the following:

- To construct and operate a new 400/110 kV substation Miletkovo, located in the area of village Miletkovo (Gevgelija municipality). The area required for construction of the substation is approximate-

ly 6 ha (300 m x 200 m). The entire substation will be constructed on an open space with equipment and safety distances for outdoor installation in accordance with the applicable technical standards.

- The new 400/110 kV substation will be connected to the existing 400 kV and 110 kV transmission network via the following interventions:
  - In-out, approx. 0.5 km long, connection with the existing 400 kV line from SS Dubrovo to Thessalonica (GR). A typical 400 kV line includes the following main technical elements:
    - Towers, designed as self-supporting towers (Figure below), with a height range between 17 and 33 metres and maximal footprint area of approximately up to 250 m^2.
    - Phase conductors, attached to the cross-arms at the towers by insulator strings, designed in compliance with national standards and European standards. The designed distance between the conductors (in horizontal plane) is 8 metres.
    - Protective wires, strung in horizontal configuration above the top most conductors between the tower peaks for protection against lightning strikes.

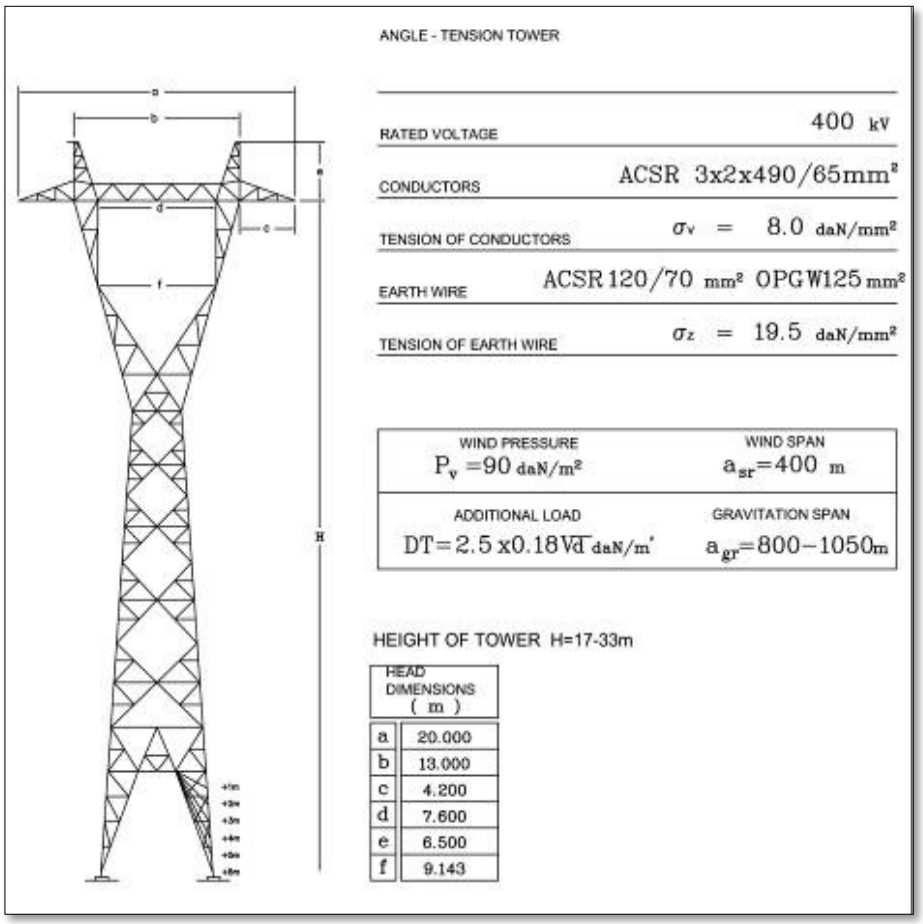

Figure 3.2: Typical tower for 400 kV single-circuit line

- Reconstruction of the existing 6 km long line from SS Valandovo to SS 'EVP' Miletkovo and its extension to the new SS Miletkovo (next Figure). The line will be reconstructed with the use of the same towers and positions and by replacing the conductor, to increase its transfer capacity. Therefore, for the purposes of this reconstruction, the existing towers will remain in use during the operational life of the reconstructed line. The dismantling works will consist of dismantling of the existing conductor, the insulator strings and earth wire. In addition, construction of an extension of the existing line is foreseen (dark blue line in the Figure below), in approximate length of 1.9 km as well as construction of a new approx. 1.8 km long line from the new SS Miletkovo to the existing SS 'EVP' Miletkovo (light blue line in the Figure below), to provide reliable supply to this substation, which is the main

power supply of the railway transport system in the southeastern part of the country. These new lines will include the following technical elements:

- Towers, with a height range between 12 and 30 metres (Figures below). The maximal footprint area for a tower is approximately from 100 m^2 up to 150 m^2.
- Phase conductors and insulator strings. One conductor per phase is foreseen. Characteristics of the conductors will be in compliance with national standards and European standards. The designed distance between the closest conductors (set in triagle formation) is between 3.65 metres and 4.6 metres).
- A ground wire strung above the towers arms at the tower peak for protection against lightning strikes.

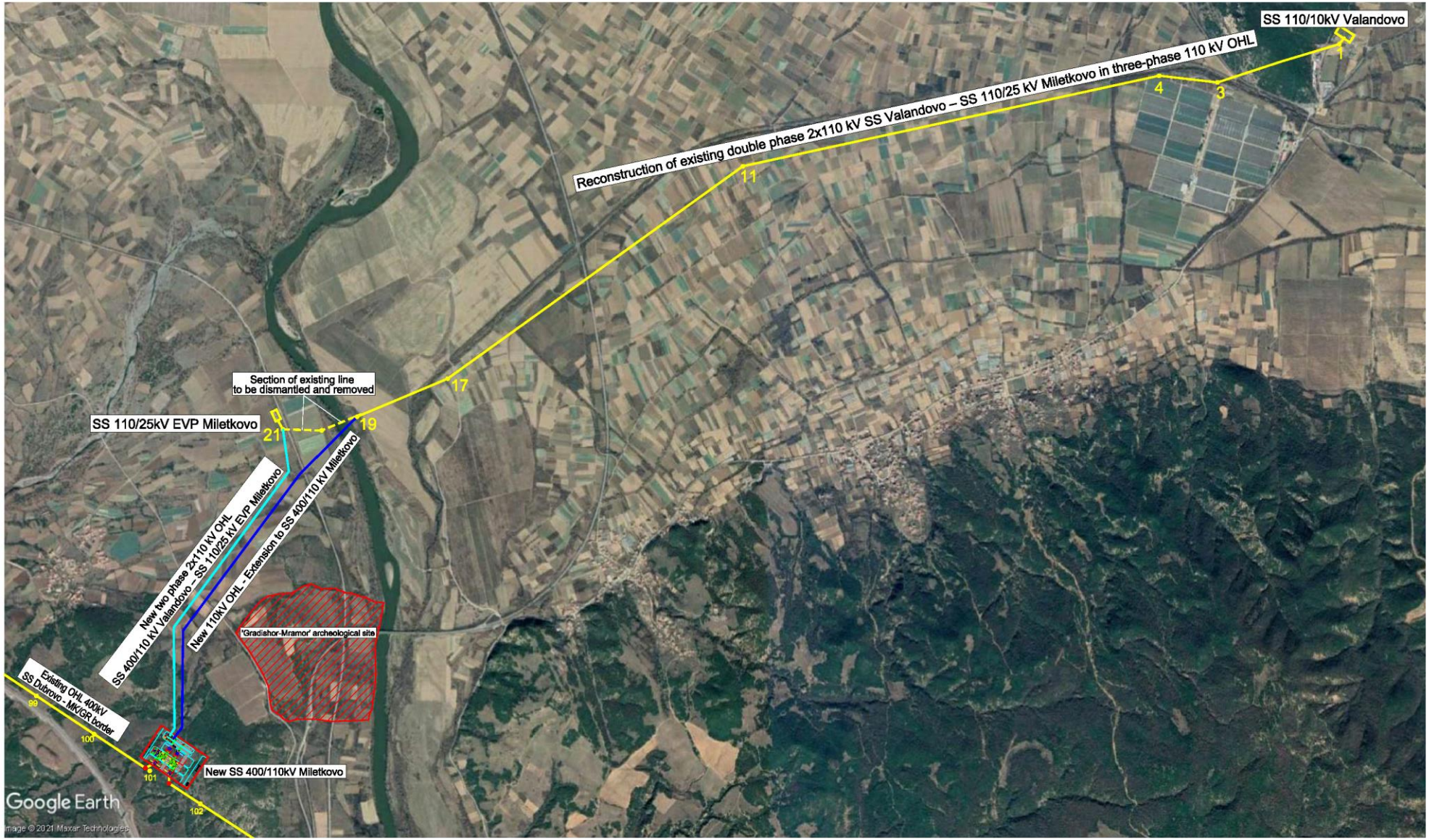

Figure 3.3: Reconstruction of existing transmission line from Valandovo substation to 'EVP' Miletkovo substation and extension to the new substation Miletkovo

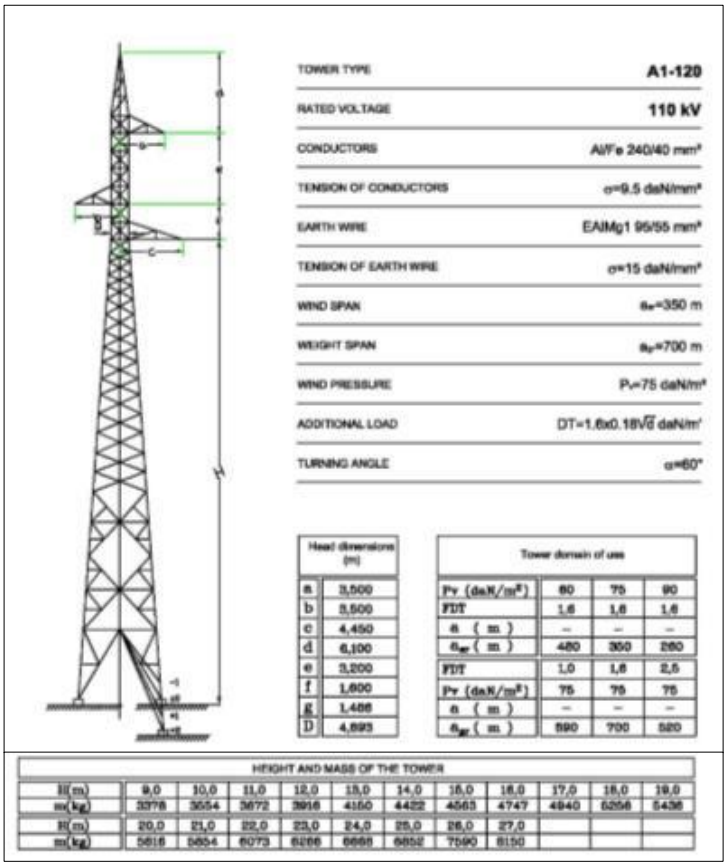

Figure 3.4: Typical tower for 110 kV single-circuit line

Note: Extension of the existing 110 kV line from SS Valandovo to SS 'EVP' Miletkovo

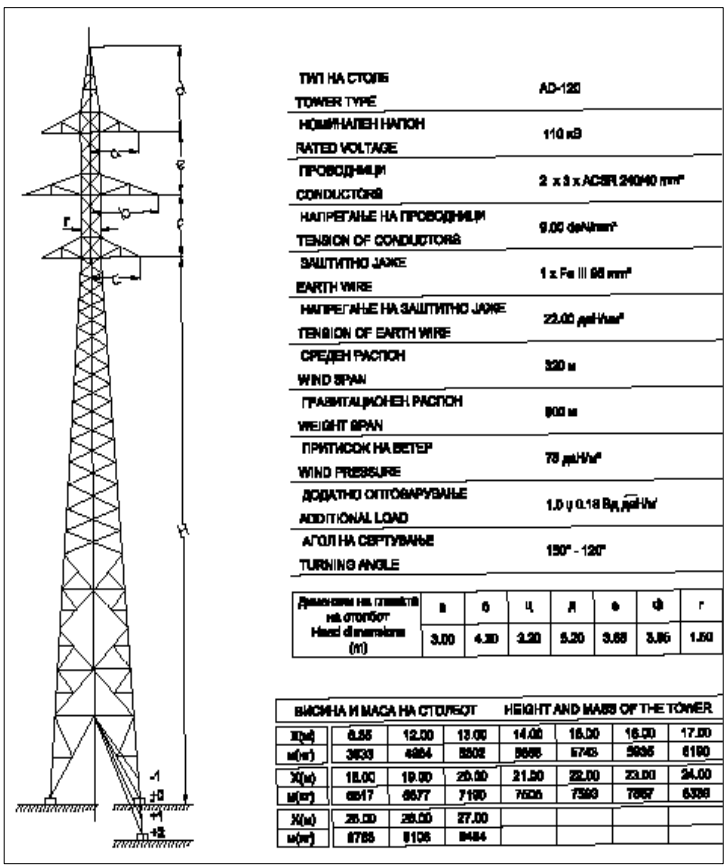

Figure 3.5: Typical tower for 110 kV double-circuit line

Note: New ine from the new SS Miletkovo to substation 'EVP' Miletkovo

3.3 Right of Way

The relevant Macedonian legislation[3] requires establishment of a protection zone (safety zone) or Right of Way (RoW) along the path of a transmission line and in proximity to a substation. This zone is prescribed by MEPSO's Grid Code[4], according to which – 'the safety zone is the area and the space, below, above and along the existing electric power transmission facilities, necessary for their spatial planning, protection and maintenance, in which the right of ownership is restricted or the possibility for performing construction actions and other activities without consent granted by MEPSO is limited'. For an operational transmission line, the protection zone is determined by the voltage of the line: 30 m and 20 m wide corridor along the path of the line, for 400 kV and 110 kV, respectively. For an operational substation with a nominal voltage of 400 kV and 110 kV, the required safety distance is 5 metres from the outer edge of the substation's fence or wall.

The regulation's objective is to facilitate the uninterrupted functioning of the power grid, to ensure safe operations, to meet the requirements of the sanitary and safety norms, and to prevent accidents. Within this protection zone buildings and facilities must not be constructed and certain activities are restricted to ensure the safe operation of the lines and for the safety of people. These mainly include agriculture activities within the RoW which include cultivated plants or trees which reach height that may pose safety operational risk for the line[5], or agricultural practices that use spraying equipment as well as fixed or mobile irrigation equip-

[3] Rulebook for Construction of Overhead Lines with rated Voltage from 1 kV to 400 kV (Official Gazette of RM no.25, from 1.2.2019)

[4] MEPSO Grid Code (2021)

[5] According to the applicable regulation, the minimum vertical clearance for an operational transmission line in regard vegetation, trees, etc. is set to 3.0 metres.

ment. It is also necessary to remove trees and vegetation from within the RoW for the safe operation of the transmission line. Therefore, in areas of forestry and woodland, clearance on either side of the transmission line within the safety zone is required according to the rules defined by the relevant Macedonian legislation[6].

3.4 Project Timeline

According to the present Project's implementation indicative schedule, the following further development stages are foreseen (for the Project as a whole):

- Year 2022 - 2024 - completion of the next Project's technical design (Preliminary Design) as well as accompanied technical documents and land acquisition documentation, including preparation of tender dossier / procurement documents for selection of Contractor(s) and selection of Contractor(s)

Year 2025 – 2027 – completion of the final Project's technical design (Detailed Design) by the Contractor(s), obtaining of construction permit and construction of the Project, including testing and commissioning, as follows: (1) supply of equipment (Q4/2024 – Q4/2025, in total 15 months); (2) civil works, installation works, etc. (Q/2024 – Q3/2027, in total 36 months), and (3) tests and commissioning (Q1/2027 – Q4/2027, in total 12 months).

Hence, the actual construction period for the Project is anticipated to be up to two years from the start of the works, including the necessary dismantling works at the existing overhead line. The construction period in any particular location along the transmission lines would be in the order of several days to weeks, while the construction of the new substation will be continuous process at the substation's construction site.

3.5 Alternatives Considered and Selection of Preferred Option

3.5.1 No Project Option

The Macedonian Strategy for Energy Development until 2040 (the Strategy) foresees high level of integration of the national system with the international energy markets and reduction of the greenhouse gas emissions associated with the energy production, by increasing the renewable energy sources in the overall energy consumption. In this context, the Project is seen as an important step towards fulfilment of the goals for integration of energy from renewable sources into the national system, since the most significant investments in this regard are (will be) located mostly in southeast region of the country.

The 'No Project' option would mean status quo situation. It does not involve capital investment costs. However, maintenance costs are higher than for lines within the expected life span because the equipment would become obsolete with an expired useful life. Consequently, this option will directly contribute to higher operational costs of the existing out-of-date transmission infrastructure in the Project region, as well as to higher technical losses. It will also decrease security and reliability of the power supply in the Project region.

Therefore, the 'No Project' option is least favourable option since it has no positive argument in its favour. If the proposed Project is not build, then it would cause a serious problem in the energy sector development and the regional integration of the Macedonian electricity system.

3.5.2 Project Options

Three options have been identified (including alternative corridors for each option) (Figure below), in order to make a clearer distinction between different network configurations.

The key technical elements of the identified options are as follows:

[6] Rulebook for Construction of Overhead Lines with rated Voltage from 1 kV to 400 kV (Official Gazette of RM no.25, from 1.2.2019)

1. Project Option 1 - Double Circuit 110 kV OHL Dubrovo – Valandovo, which includes the following main components:
    a. Construction of a new double circuit 110 kV OHL between Valandovo and Dubrovo
    b. New 400/110 kV power transformer in the 400/110 kV SS Dubrovo, with respective 110 kV and 400 kV bays
    c. Reconstruction of the existing 110 kV OHL Valandovo – Strumica 2 – Strumica 1
2. Project Option 2 - New 400/110 kV substation and lead in-out of existing 400 kV OHL Dubrovo – Thessalonica (GR), which includes the following main components:
    a. Construction of a new 400/110 kV substation
    b. Connection of the existing 400 kV OHL Dubrovo – Thessalonica (GR) into the new substation
    c. Reconstruction of the existing 110 kV OHL Valandovo – Strumica 2 – Strumica 1
3. Project Option 3 – New 400/110 kV substation with interconnection (new 400 kV OHL Dubrovo – Valandovo – Thessalonica (GR)), which includes the following main components:
    a. Construction of a new 400/110 kV substation
    b. Construction of a new 400 kV OHL Dubrovo – Valandovo – Thessalonica (GR)
    c. Reconstruction of existing 110 kV OHLs Valandovo – Strumica 2 – Strumica 1

As an element of the wider development scheme for strengthening the transmission network in the South-east Region of North Macedonia, the Sub-project 2 - Reconstruction of the existing 110 kV OHL Valandovo – Strumica (Component 2) was included in each of the identified options. As such, this element was not a comparative factor for the decision-making process for selection of the preferred option and was not taken into the comparative analysis of the identified options[7].

[7] For more details see:

- WB21-MKD-ENE-03 North Macedonia, Strengthening the Transmission Network in the Southeast Region of North Macedonia - Component 1; Selection of the preferred Option, October 2021
- WB21-MKD-ENE-03 North Macedonia, Strengthening the Transmission Network in the Southeast Region of North Macedonia - Component 1; ESIA Scoping Report, January 2022

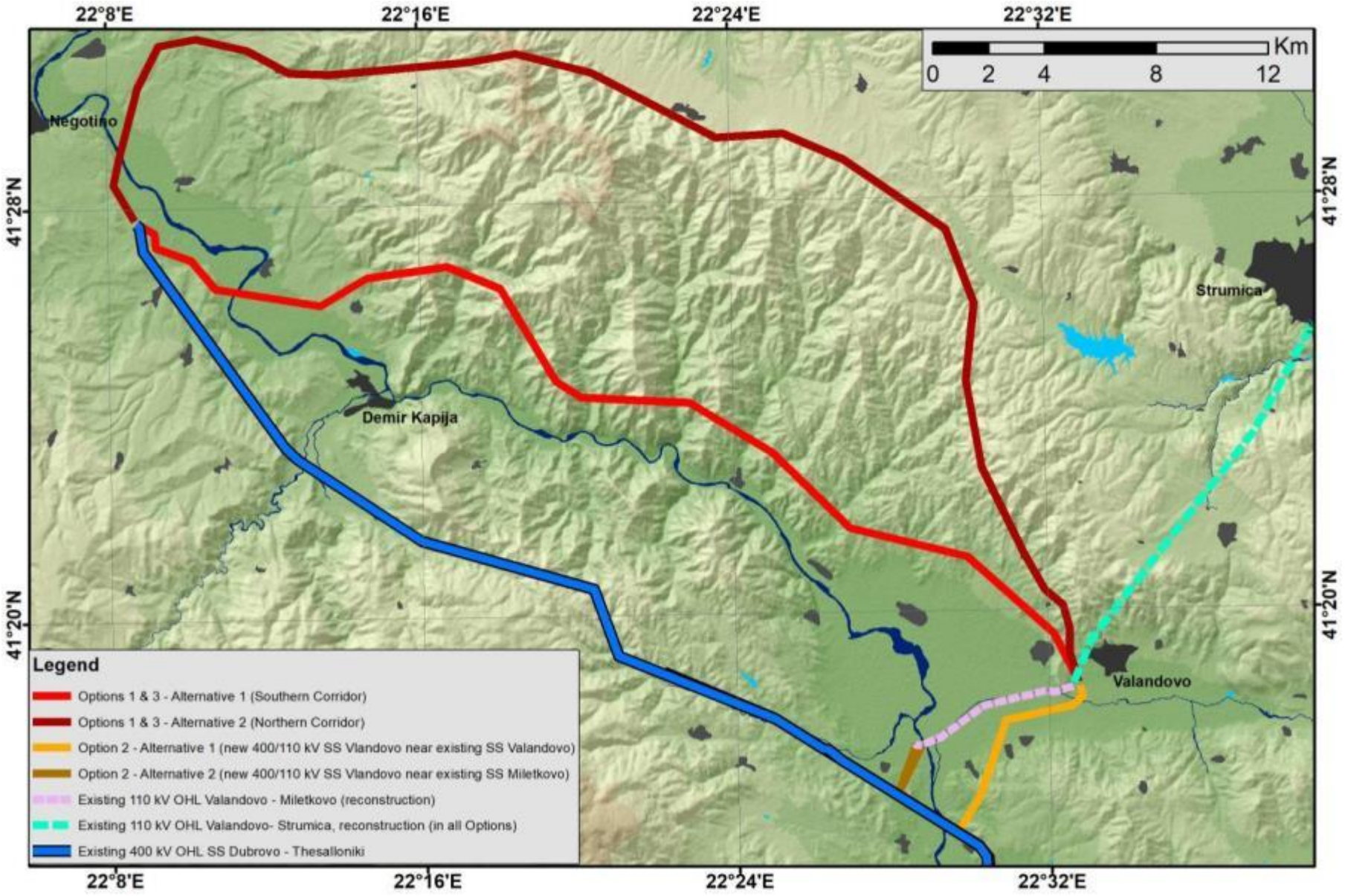

Figure 3.6: Project options and alternatives within Project options

3.5.3 Evaluation of Options - Multi-Criteria Analysis

The identified options have been evaluated via a Multi-Criteria Analysis against the following main criteria categories:

(i) network and market based criteria, with two sub-categories – non monetised benefits and monetised benefits and costs (e.g. variation of CO_2 emission, integration of the renewable energy sources, benefit / cost ratio, socio-economic welfare, etc.)
(ii) engineering or technical criteria (e.g. terrain conditions and topography, climate parameters, landa-vailability, etc.)
(iii) environmental and social criteria, with two sub-categories - environmental elements (e.g. biodiversity and sensitive zones such as forests, protected areas, etc.) and social elements (e.g. proximity to people and settlements, health and safety such as exposute to electric and magnetic fields, cultural and archaeological heritage, etc.).

3.5.4 Selection of Preferred Option

The selection process of the preferred Project option based on the evaluation of each identified option and alternatives within the options against the selected criteria has indicated that preferred option would be the Option 2, Alternative 2 - New 400/110 kV SS Miletkovo and lead in-out of existing 400 kV OHL Dubrovo – Thessalonica (GR).

The rationale behind this recommendation is as follows:

- System studies and economic assessment

  According to the results of system studies, Option 2 is indicated as the best one from the reduction of energy curtailed from RES in the Project region, from the biggest losses reduction, and increase of additional capacity reserve.

  From economic assessment point of view, the Project brings sufficient benefits to Macedonia and it is mpost economically viable option for the society and the national economy as a whole.

- Technical assessment and E&S aspects

  From the technical as well as from the environmental and social perspective, the Option 2, Alternative 2 is superior in comparison to other identified Project options and respective alternatives, since:

  - It does not require construction of new long 110 kV or 400 kV overhead line and, therefore, it implies the least land-take needs and land cover / land use changes;
  - It implies the least interventions (reconfiguration and extensions) in the existing transmission assets in the Project region and, therefore, the least impact on the existing operation of the power system;
  - There are no settlements in proximity to the Project locations and no operational community safety risks (e.g. public exposure to electro-magnetic radiation or nuisance due to corona noise) are likely to occur;
  - It implies the least potential impact magnitude to sensitive habitats in the Project region;
  - It does not interact with any legally protected area or internationally recognised area in the Project region;
  - It implies the least potential impact magnitude on agricultural land and, therefore, will likely result in the least compensation arrangements;
  - There are no cultural heritages sites and resources in proximity to the Project locations.

The preferred Project option consists of the following components:

- Construction of a new SS Miletkovo, located in Miletkovo area (Gevgelija municipality), with its connection to the existing 400 kV and 110 kV transmission network via the following interventions:

- Approx. 0.5 km long line for connection with the existing 400 kV line from SS Dubrovo to Thessalonica (GR)
- Reconstruction of the existing approx. 6.4 km long transmission line from SS Valandovo to SS 'EVP' Miletkovo and its extension to the new SS Miletkovo.
- Construction of a new approx. 1.8 km long 110 kV OHL connector with the existing SS 'EVP' Miletkovo

Based on the subsequent review and consultative process with key relevant stakeholders[8], this proposal was accepted by MEPSO and EBRD in October 2021 and it was selected as preferred Project option for further development and E&S assessment.

The preferred Project option is shown in Annex.

4. Environmental and Social Assessment Summary

Different project aspects have been considered throughout the process of assessing the impact of the Project on the biophysical and societal environment.

The high level summary of the assessment and the effects for individual relevant E&S topics is provided in Table below, and more detailed assessment is done as part of the respective Environemntal and Social Assessment Report.

[8] For more details see: WB21-MKD-ENE-03 North Macedonia, Strengthening the Transmission Network in the Southeast Region of North Macedonia - Component 1; Stakeholder Engagement Plan, March 2022

Table 4.1: Summary of assessment of likely significant environmental and social impacts and and key mitigation

Topic	Phase	Key Potential Impacts	Significance (without mitigation)	Key Mitigation	Residual Impact
Climate – Greenhouse Gases	Construction	Construction GHG emissions Note: Since the Project is in its initial development stage and the relevant information for GHG calculation during construction stage of the Project is currently not available (e.g. number of OHL towers, construction transport and methods, etc.), the calculation of GHG emissions associated with the construction of the Project has been scoped out from the present assessment[9] and, if required, it is to be considered as part of next development stages of the Project (e.g. Preliminary Design or Detailed Design).	NA	- Calculation of GHG emissions associated with the construction of the Project, based on proven methodology - Construction Environmental and Social Management Plan (CESMP) - Traffic Management Plan - Waste Management Plan Other principle mitigation: - Optimisation of the construction methods to reflect the carbon reduction hierarchy - Select and engage with material suppliers and Contractor(s) taking into account their policies and commitments to reduction of GHG emissions, including embodied emission in materials. - Request from Contractor(s) to: minimise energy consumption, including fuel usage; maximise the local sourcing of materials and the use of local waste management facilities.	NA
	Operation	Operational GHG emissions Note: GHG emissions are expected to be very small over time during operational life of the Project. Therefore, calculation of GHG emissions during operation and maintenance of the Project have been scoped out from the assessment[10].	None to minor adverse	- Low carbon design specifications such as energy-efficient lighting (at the substation) and durable construction materials to reduce energy consumption and maintenance and decrease replacement cycles.	Minor adverse

[9] For more details see: WB21-MKD-ENE-03 North Macedonia, Strengthening the Transmission Network in the Southeast Region of North Macedonia - Component 1; ESIA Scoping Report, January 2022

[10] For more details see: WB21-MKD-ENE-03 North Macedonia, Strengthening the Transmission Network in the Southeast Region of North Macedonia - Component 1; ESIA Scoping Report, January 2022

Topic	Phase	Key Potential Impacts	Significance (without mitigation)	Key Mitigation	Residual Impact
Climate - Resilience	Operation	Vulnerability to a range of climate change risks, including an increased frequency and severity of prolonged and/or heavy precipitation events and lightning, cold and heat waves, and an increased risk of storms with high wind speed. These extreme weather events associated with the expected climate changes may result in varios impacts (e.g. material deterioration due to high or low temperatures and heavy rainfall, flood risk at the substation location, storm damage to the structures and equipment, etc.)	Significant	Design-based measures would need to be identified and incorporated into the further project design stages (e.g. Preliminary Design and Detailed Design, based on the climate design parameters applicable for the Project region), so to achieve that the Project is designed to be resilient to impacts arising from current and future weather events and climatic conditions, and designed in accordance with current planning, design and engineering practice and codes.	Not significant
Air Quality	Construction	Construction emissions (dust and particulate matter, construction traffic)	Minor to moderate adverse	- CESMP with associated management procedure and plans - Traffic Management Plan	Not significant
	Operation	During the operation phase of the Project it is not anticipated that there would be any significant emissions to air and no significant air quality impacts would occur.	Minor adverse	Good operational practice	None
Geology and Soils	Construction	Disturbance effects to geological deposits and soils due to construction works and transport activities. The project area is characterised with very low potential erosion risk and landslide hazard.	Minor adverse (for the Project as a whole)	CESMP with associated management procedure and plans	Neutral
		Key risks to soils - degradation of shallow geology and topsoil due to contamination, and loss of fertile soil through excavation and removal	Minor to moderate adverse		Neutral to minor
	Operation	Degradation of topsoil due to contamination during maintenance works	Minor adverse	Prevent and control pollution	Neutral to minor
Water Environment	Construction	Risks to the water environment due to excavation and deposition of soils or other construction materials causing pollution, spillage of fuels or other contaminating liquids; etc.	Minor to moderate adverse	- Good design practice based on avoidance strategy (e.g. setting Project locations away from watercourses and wetlands) - CESMP with associated management procedure and plans	Neutral
	Operation	Risks suc as accidental spillage of oils and fuels from vehicles and accidental spillage of transformer oils at the substation.	- Minor adverse - Moderate adverse (in a case of spilage)	- Good design practice based on avoidance strategy (e.g. prevent accidental spillages of transformer oils at the substation by installation of protection measures against spills in line with design standards). These include oil / storm water tank, placed bellow energy transformers with suitable capacity designed to accept accident oil spillage. - Good operational and maintenance practice	Neutral to minor
Noise and Vibration	Construction	Noise emissions from construction vehicles and machinery	Moderate adverse	- CESMP - Traffic Management Plan	Minor

Topic	Phase	Key Potential Impacts	Significance (without mitigation)	Key Mitigation	Residual Impact
	Operation	Noise due to the phenomenon known as "corona discharge"[11]	Major adverse	Design-based measures: - Avoidance of potential effects due to operational noose from the Project have been achieved by avoiding the populated areas in the Project region as well as residential zones and other properties have been achieved - Incorporation of respective design parameters into the Project design (e.g. set out minimum required conductor vertical clearance (6 metres) and application of noise reducing coatings for conductors, if deemed necessary). Pre-construction and construction: - Ensure that correct manufacturing and installation methods and procedures are provided as an essential prerequisite measure that would allow reduction of eventual audible nuisance due to operations of the transmission line.	Neutral
Biodiversity	Construction	Loss and disturbance of terrestrial habitats (destruction and alteration of habitats as a result of land take requirements) and habitat conversion at the substation site and beneath OHL conductors (creation of a clearance corridor). In total, the clearance will be made on a small surface of maximum 6.2 ha	- Minor adverse (for the Project as a whole) - Moderate adverse (sensitive habitats at crossing of Vardar River)	CESMP with associated management procedure and plans	Minor
		Adverse changes in aquatic habitats	Minor to moderate adverse		Neutral
		Loss of terrestrial flora	Negligible		Neutral
		Disturbance of species due to construction (breeding, foraging, roosting)	Minor adverse		Neutral
		Introduction of alien species	Negligible		Neutral
		Key Biodiversity Features (Critical Habitat – CH and Priority Biodiversity Features PBF). In total, there are 5 species that trigger CH (amphibians and reptiles – negligible impact) and 2 species (birds- Kingfisher and Turtledove and 1 habitat (Willow-Poplar riparian belts) that trigger PBF (minor impact).	Negligible to minor		Minor
		Designated Areas (legally protected areas and/or internationally recognised areas) Note: There is no interaction between the Project	None	Not applicable	Neutral

[11] A limited electrical insulation breakdown of the air

Topic	Phase	Key Potential Impacts	Significance (without mitigation)	Key Mitigation	Residual Impact
		and any designated area.			
	Operation	Conversion of habitats (maintenance of the clear-ance corridor)	Negligible	Good operational and maintenance practice	Neutral
		Fauna: potential impact to avian fauna (collision risk and electrocution of birds)	- Collision risk: Minor - Electrocution: Negligible	- Design-based measures to be incorporated into the further project design stages (e.g. installation of bird (flight) diverters to the earth wire of the transmission line at the crossing over the Vardar River to mitigate the bird collision risk, use of insulator chains to ensure that the bird electrocution hazard is prevented, which comply with the in-ternational energy standards). - A post construction monitoring programme to assess the mortality due to collision to be designed and implemented at the Vardar River cross-ing section during first three years of the Project implementation.	Minor Negligible
Landscape and Visual	Construction	Visual impacts - direct temporary physical and visual change to the landscape of negligible significance.	None to minor adverse	CESMP with associated management procedure and plans	Neutral
	Operation	Visual impacts – exposure of the particular Project elements (i.e. the new substation and connectors) as new structures to the landscape - not anticipated as significant.	None to minor adverse	Good operational and maintenance practice (e.g. allow the maximum vegetation height within the Right of Way corridor while still maintaining the required clearance; width of all access roads and tracks to be kept to the minimum necessary for their use).	Neutral
Waste Gener-ation	Construction	Waste generation and disposal, including hazardous waste and intert construction waste (earth material)	Moderate adverse	Waste Management Plan, based on the following key principles: - Waste to be minimized wherever practicable by reusing and recycling any materials, including the spoil and surplus excavated material. - All wastes to be identified, classified, quantified and, where practica-ble, appropriately segregated. - All waste materials removed from construction sites would be in ac-cordance with relevant national waste and environmental regulations.	Minor
	Operation	Waste generation and disposal Note: Waste generation is expected to be very small during operation of the Project.	Minor adverse	These wastes to be managed by MEPSO using the procedures estab-lished in their Integrated Management System[12] which, inter alia, in-cludes a certified environmental management system.	Neutral
Beneficial social aspects	Construction	Opportunities, such as employment opportunities and local economy and supply chain opportunities	Moderate beneficial	Various instruments (e.g. Supply Chain Management based on preferable supply from local suppliers)	NA
	Operation	Improvement of the national power system	Major beneficial	/	NA

[12] MEPSO has an IMS, incorporating quality, environment and health & safety, certified under respective international standards - ISO 9001 (Quality Management System), ISO 14001 (Environmental Management System) and OHSAS 18001 (Occupational Health and Safety Management System), as well as ISO 50001 (Energy Management System). Note: some of these certificates require renewal.

Topic	Phase	Key Potential Impacts	Significance (without mitigation)	Key Mitigation	Residual Impact
Labour and Working Conditions	Construction	Workers employment, rights and working conditions	Minor to Moderate adverse	Package of management procedures and plans, e.g.: Code of Conduct for Workers; Occupational Health and Safety Plan; Grievance Mechanism for Workers; Emergency Preparedness and Response Plan	Neutral to minor
		Occupational health and safety (e.g. working on height, electrocution, etc.)	Moderate adverse		Neutral to minor
		Workers' accommodation	Minor adverse		Neutral
	Operation	- Labour and Working Conditions - Occupational Health and Safety (e.g. electrocution from the energised conductors)	Moderate adverse	Environmental and Social Management System	Neutral to minor
Community	Construction	Community health and safety riks, such as construction traffic risks, safety risks and workers influx	Minor to moderate adverse	Package of management procedures and plans, e.g.: Code of Conduct for Workers; Community Health, Safety and Security Plan; Traffic Management Plan; Emergency Preparedness and Response Plan; Stakeholder Engagement Plan	Minor
	Operation	Community health and safety - Public Exposure to Electro-Magnetic Radiation - Operational risks	Minor to moderate adverse	Electric and magnetic fields - design-based measures through the further design of the Project: - Incorporation of respective design parameters for the minimum conductor vertical clearance (6 metres) into the Project design. - Establish safety / clearance corridor along the path of the transmission lines and safety distance from the substation according with the requirements of the relevant Macedonian legislation. - Appropriate selection of the towers micro locations within the selected corridor in relation to residential and other properties. Risks to communities during Project operation: - Provide hazard notices / signs / barriers to prevent access to energized components of the Project.	Minor
Property	Construction	Land acquisition and land use	Minor adverse	- Compliance with relevant Macedonian legislation and EBRD's PR 5 requirements - Land Acquisition and Resettlement Framework - Resettlement Plan	MinorNeutral
Cultural Heritage	Construction	Potential loss or damage of unknown heritage assets (undiscovered archaeological sites)	Minor to moderate adverse	Chance-find procedure development and implementation	Neutral
Cumulative effects	Construction	Interaction with other similar projects (air pollution, nuisance due to construction noise, traffic disturbance, waste generation, etc.) – low probability	Negligible	If necessary, coordinated E&S management and cooperation between contractors of the developments throughout the construction period will be needed in order to optimize the mitigation strategy (e.g. Waste Management Plan, Traffic Management Plan, etc.).	Neutral
	Operation	Interaction with other similar projects – other transmission project(s) or wind farm developments (visual impact) – not likely in the Project region	Minor	/	/

5. Environmental and Social Management

5.1 Introduction

A Project's Environmental and Social Management Plan (ESMP), as a standalone document, consisting of a set of mitigation and monitoring measures, criteria for their successful implementation and institutional measures to be taken during the Project implementation to eliminate adverse environmental and social impacts, offset them, or reduce them to acceptable levels, has been developed. It has been prepared based on the findings of this E&S appraisal to ensure that the Project is executed in compliance with applicable Macedonian laws and regulations and EBRD environmental and social requirements.

The ESMP is a key document that lists the environmental and social requirements, including health and safety risks, and details the operational procedures necessary for managing the significant issues connected to the Project activities.

The ESMP will be implemented during the pre-construction, construction and operation / maintenance of the Project. As such it can be used as a standalone document during the different phases of the Project by the key Project stakeholders: MEPSO in its capacity as Project Developer / Operator and by the Contractor(s), as well as by the governmental authorities and other competent / responsible parties.

The E&S Management of the Project comprises a set of measures or specifications that have been originated following the outcomes of the Project's E&S assessment but also measures that are considered to reflect GIP.

MEPSO takes overall responsibility for the implementation of environmental and social mitigation and compensation measures of the Project. Effective implementation of these specifications before and during the construction phase will be supervised by a Consultant who is to be appointed by MEPSO. MEPSO will be responsible and take ownership of the measures relevant to the operation and maintenance phase of the Project.

5.2 Organisation of Environmental and Social Management

The core (indicative) structure and organization of the Project's environmental and social management is presented in the Figure below.

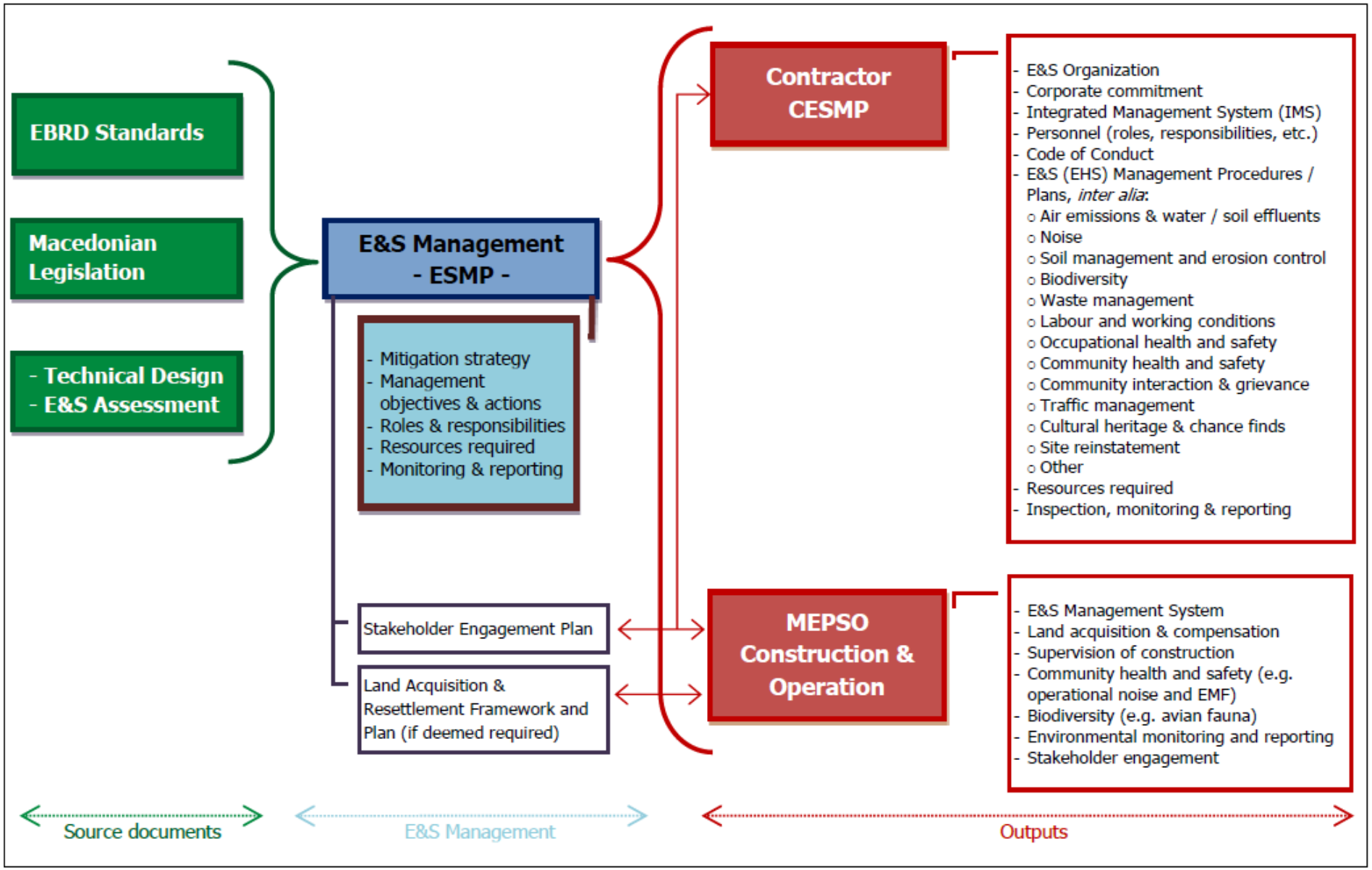

Figure 5.1: Core structure and organization of the Project's Environmental and Social Management

6. Annex – Project Map